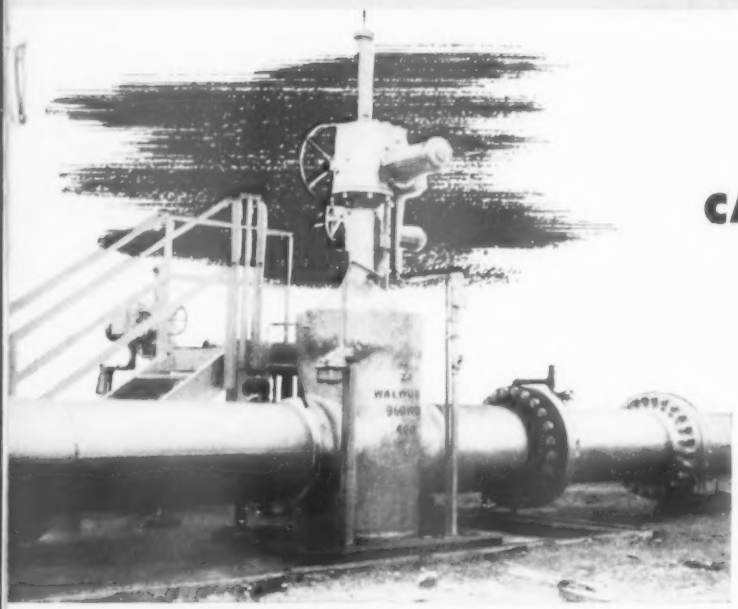
the OIL AND GAS JOURNAL

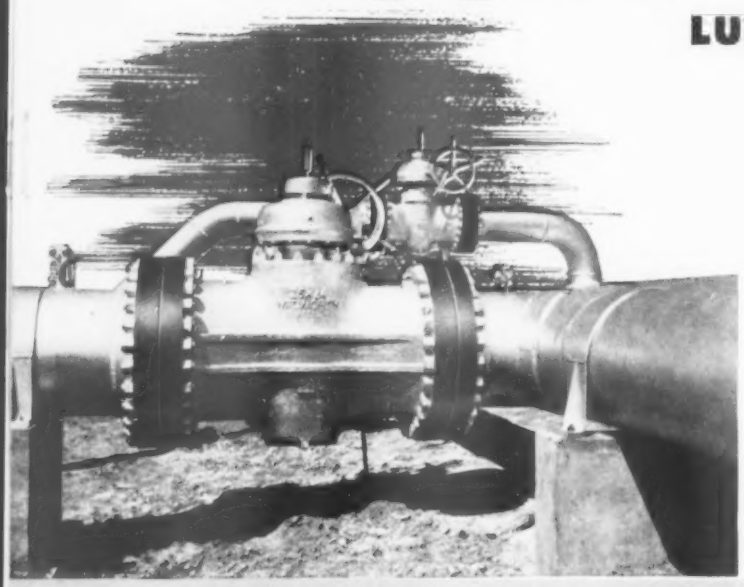


CAST STEEL GATE VALVES

A 24-inch Walworth Type 49 Series 400, 960 WOG, Cast Steel Gate Valve with welding ends and motor operating device, on a pipeline handling crude petroleum.

Walworth Type 49 Valves are especially designed for service on pipelines handling gas, refined products, or crude oil. Through-port construction allows free passage of pigs and scrapers. These valves do not require any internal lubrication and may be installed without regard to direction of flow.

WALWORTH makes both for pipeline service



LUBRICATED PLUG VALVES

A Walworth 26 x 24-inch, 1000 WOG Cast Steel, Worm Gear Operated, Flanged, Lubricated Plug Valve installed on main line discharge of a gas pipeline.

Walworth Lubricated Plug Valves afford quick, easy operation . . . a quarter turn gives full, direct port opening. The lapped surfaces of the plug and body, plus the seal afforded by the lubricant, assure a tight, leakproof valve.

Always use Walworth lubricants in Walworth Lubricated Plug Valves.

Let us help you with your pipeline valve problems. Because we make *both* gate valves *and* lubricated plug valves, we can give you an unbiased recommendation regarding the best type of pipeline valve for your particular need. See your nearest Walworth distributor, local Walworth representative or write: ***Walworth Company, General Offices, 60 East 42nd Street, New York 17, N. Y.***

PRICE 50 CENTS TABLE OF CONTENTS ON PAGE 1 **NOVEMBER 23, 1953**

Right there when you want 'em!

LANE-WELLS
Wireline Drillable
BRIDGING PLUGS

don't keep you waiting! Lane-Wells branches, strategically located for quick service to every active drilling area, give you the plugs you want, in the type and size you need, right when you need 'em.

Available in two types

MAGNESIUM for fastest possible drill-out; CAST IRON for greatest strength. MAGNESIUM plugs drill out or knock down in 1 to 3 hours, and are rated to hold against differential pressures up to 6,000 p.s.i. CAST IRON plugs are rated to 10,000 p.s.i. differential pressure, will outlast the casing in permanent installations, yet drill out or knock down in 4 to 6 hours, with either rotary or cable tools. Both plugs run fast through fluid—both plugs set, easily, right where you want them—both give *positive, leak-proof packoff against pressures either up or down.*

Tomorrow's Tools—Today! LANE WELLS COMPANY

General Offices, Export Office, Plant • 5610 So. Soto St., Los Angeles 58

LOS ANGELES • HOUSTON • OKLAHOMA CITY • LANE-WELLS CANADIAN CO. IN CANADA • PETRO-TECH SERVICE CO. IN VENEZUELA

the OIL AND GAS JOURNAL

NOVEMBER 23, 1953 VOL. 52 NO. 29

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In Brief . . .

1. CHEAPER DRILLING . . . Proper care of drilling lines adds up to safer and longer service from wire rope. This important investment can be protected by an enlightened study of loading.

Normally, the bulk of service by the drilling line is performed during round tripping, drilling, and coring. Therefore, an accurate accounting of the ton-miles of work incident to these operations will afford a sound basis for proper utilization of the line, and for determination of maintenance procedures.

2. EXCESS BENZENE . . . Benzene, one of the prime building blocks of the organic-chemical industry, has been consumed in ever-increasing amounts since the beginning of World War II. Its requirements are based on the demand for products which use it as a raw material. A survey of the forecasted demand for these products shows that there will be excess benzene capacity by 1955. However, there will be no dumping of petroleum benzene, since catalytic reformers will be turned to high-octane gasoline production.

3. FASTER CALCULATIONS . . . Correlations have been developed from which 30-32-grade natural-gasoline content can be estimated according to the oil gravity and the pressure at which separation is carried out. These correlations are based on the C.N.G.A. charcoal absorption test, which approximates the butanes-plus liquid content of gas. This test is also a fair approximation of the liquids extraction obtained in low-pressure natural-gasoline absorption plants.

4. RIG POWER IMPROVEMENT . . . The need for an absolutely sparkproof drive for the shale shaker makes application of hydraulic motors to rig auxiliaries particularly attractive. Fluid power units also offer other advantages in ease of control, compactness, sturdiness, and general flexibility.

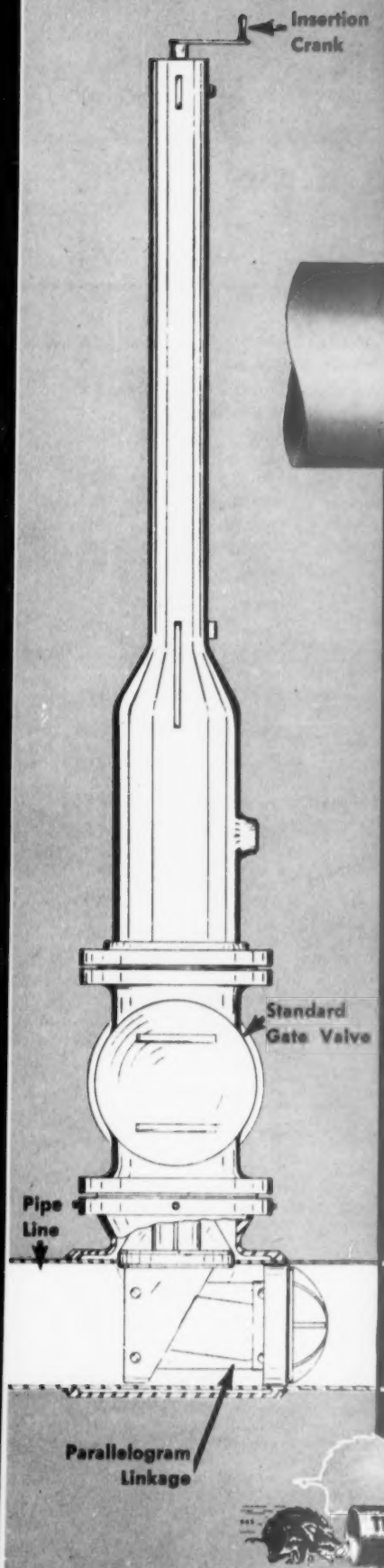
In many instances, a hydraulic system receiving motivation from the drilling engines will eliminate the necessity for daylight operation of the light plant.

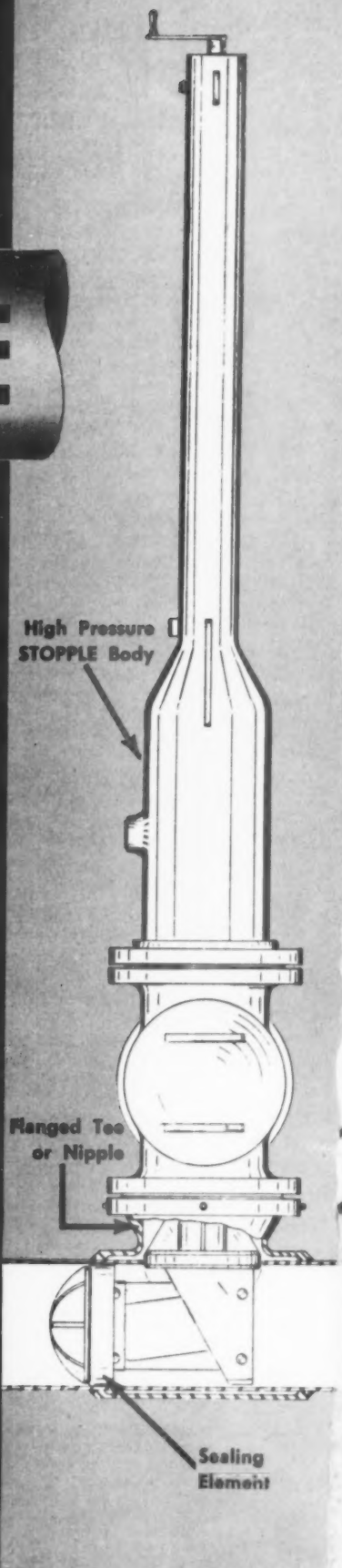
5. IMPROVED DISTILLATION . . . Mist extractors in vacuum tower operation have been very effective in removing entrained asphalt from catalytic cracking unit charge stock, thereby preventing metals contamination of the cracking catalyst.

Installation in existing or new towers is not particularly difficult, and the expenditure is quickly repaid by better operation of the cracking unit.

STOP expensive shut-downs with the Williamson

WILLIAMSON
STOPPLE
T. D. WILLIAMSON, INC.
TULSA, U. S. A.





NOW YOU CAN....

- Repair or Replace Pipe.
- Install or Repair Valve.
- Install fittings.
- Tie in loops.
- Connect booster station.
- Install scraper trap.
- Install metering devices.
- Extend or abandon piping.

. . . All without draining down the pipeline

. . . often without halting operations.

HOLDS PRESSURES UP TO 1000 PSI WATER, OIL, GAS

With STOPPLES installed, you can drain this section of pipe and proceed with any jobs listed above.

T.D. Williamson, Inc.

THE PIG WITH THE POKE
CLEANS PIPE LINES

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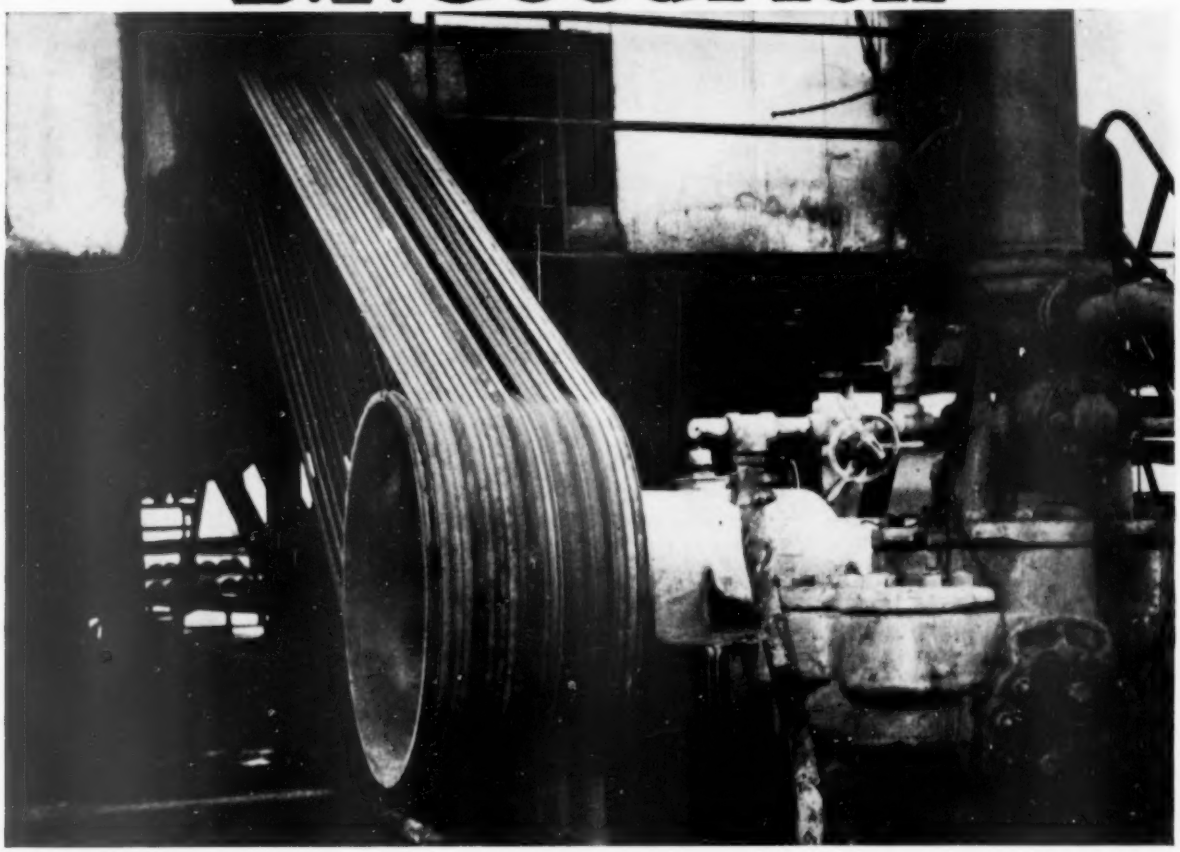
RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER



Grommet belts still at work after two years and 20 oil wells

B. F. Goodrich V belts last longer, yet cost no more

THOSE B. F. Goodrich Grommet V belts run the mud pump of a Texas oil drilling rig. While the average set of V belts lasts only 12 months in this type of service, the Grommet belts had been running two years when this picture was taken. And this job was their 20th well, representing a total of 142,000 feet of drilling. In spite of continuous high speed and exposure to all kinds of weather, these Grommet belts were still going strong, and were moved to their 21st well.

Strongest V belt made

No wonder B. F. Goodrich Grommet belts outlast and outperform ordinary belts. In Grommet belts, all the load-carrying cords are concentrated in twin grommets. A grommet is like a giant twisted cable except that it's endless. Since there are no center cords, the Grommet belt is more flexible, and so can "give" temporarily and absorb shock loads. And there's no overlapping cord *section* as in all ordinary belts —no weak spots to cause premature belt failure.

⅓ more gripping power

Grommet V belts have more rubber in relation to belt size. Without any stiff overlap, they're free to flex and grip sheaves better. Size for size, Grommet belts give ⅓ more gripping power with less slip, pull heavier loads with a higher safety factor.

Send for proof today

Send coupon for a set of reports showing actual installations where Grommet V belts have outlasted all others. See how you, too, can make important savings in belting, production and maintenance costs with these stronger, longer-lasting V belts.

Grommet—T. M. The B. F. Goodrich Co.

The B. F. Goodrich Company
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☐ Send set of installation reports on Grommet belts.
☐ Have a BFG distributor call on me.

Name_____

Company_____

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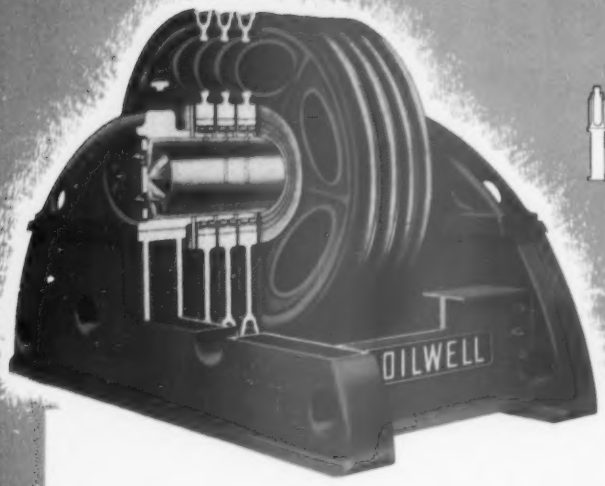
B.F.Goodrich
INDUSTRIAL PRODUCTS DIVISION

What do you look for when buying



CROWN and TRAVELING Blocks?

If it's DEPENDABLE PERFORMANCE

. . . you'll like the way this new series of "Oilwell" Crown and Traveling Blocks have been streamlined and balanced. Crown Blocks pass readily through the water-table without hanging . . . and these narrower Traveling Blocks, with low center of gravity and free-running sheaves, remain vertical even when running with light loads at high speeds.

If it's EASY MAINTENANCE

. . . you'll be amazed at the speed with which a man with a grease gun can lubricate all moving parts. Grease fittings are conveniently located and readily accessible. Also, when stringing up, the wire-line end follows sheave-grooves of the Traveling Block, in one side and out the other without a hitch. When sheaves or bearings need replacement side plates can be removed in a jiffy.

If it's SERVICE LIFE

. . . you'll appreciate the way the free-running, dynamically-balanced manganese sheaves take on added groove hardness under multiple wire-line impacts . . . and how the high-capacity bearings, which operate at relatively low travel-speeds, give you extra ton-miles of service regardless of speed-load conditions. They're built to last!

Contact . . . your nearest "Oilwell" Representative, the next time you're buying Blocks, and let him give you complete specifications on the "Oilwell" line . . . or ask for Booklet No. 10-53.

BRIEF SPECIFICATIONS

	No. 580 CROWN	No. 480 TRAV.	No. 500 CROWN	No. 400 TRAV.	No. 360 CROWN	No. 300 TRAV.
Load Capacity, tons	580	480	500	400	360	300
No. of Sheaves	7	6	6	5	6	5
Outside Sheave Dia., ins.	50	50	50	50	42	42
Center Pin Dia., ins.	12	12	12	12	9¼	9¼
Weight, Domestic, lbs.	12,650	13,190	11,700	11,970	6,850	9,600
Export, lbs.	13,550	13,790	12,600	12,570	7,650	10,200

OIL WELL SUPPLY
DIVISION
UNITED STATES STEEL CORPORATION

Executive Office—DALLAS, TEXAS
Export Office—
30 ROCKEFELLER PLAZA
NEW YORK 20, N. Y.

Area Offices—
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CASPER, WYOMING.....COLUMBUS, O.
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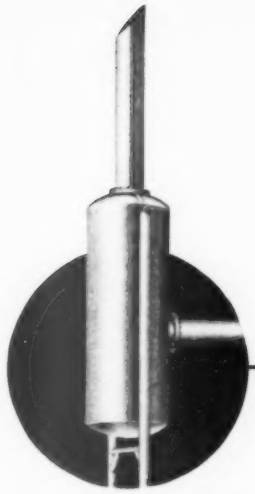
USS

"OILWELL"

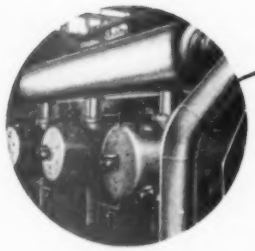
TRADE MARK

UNITED STATES STEEL

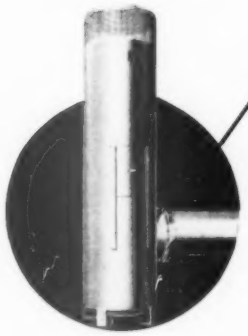
Pulsation Free COMPRESSOR PIPING
plus
Quiet ENGINE OPERATION
by BURGESS-MANNING



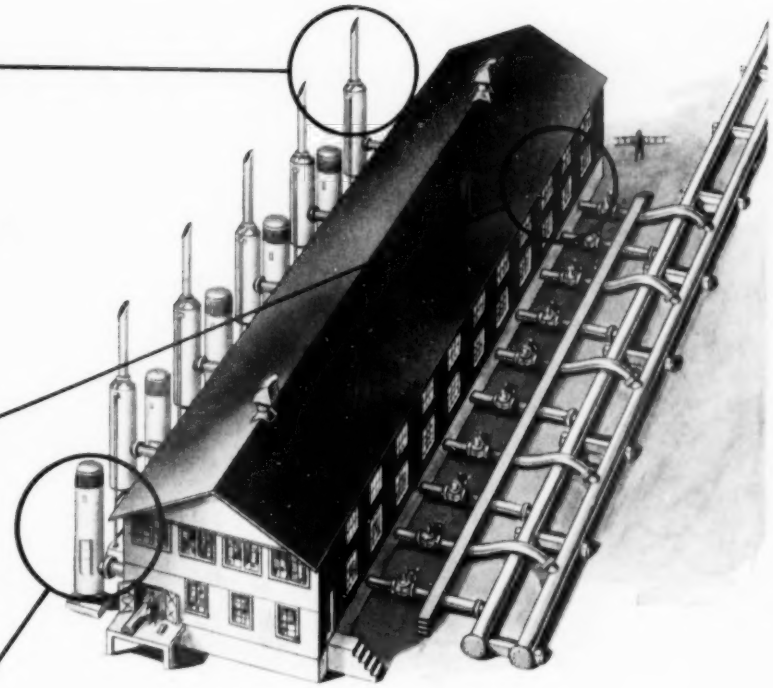
1 EXPLOSION RESISTANT
Engine Exhaust Snubber



2 PULSATION SNUBBER
Eliminates Gas Pulsation



3 AIR INTAKE
Cleaner Snubber



Burgess-Manning has designed a versatile line of Noise and Pulsation Snubbers, also Combination Air-Cleaner Snubbers, for engines and compressors to meet the exacting noise control and surge control needs of the petroleum and chemical industry. For example, here is how Burgess-Manning Snubbers can be effectively used in a compressor installation:

- Eliminate gas pulsation in compressor piping systems which often results in excessive vibration, material fatigue, and loss of efficiency.
- Reduce noise from exhausts of internal combustion engines . . . combine exhaust quieting with resistance to explosion.
- Clean intake air, prevent noise, and control suction line pulsation on engines driving compressors.

BURGESS-MANNING COMPANY
SOUND ENGINEERING
1203 Dragon Street
Dallas, Texas

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You will find definite savings by switching from

50% to 73% CAUSTIC SODA

TAKE THIS COLUMBIA-SOUTHERN CUSTOMER AS AN EXAMPLE. This customer's cost for 50% caustic would be $68,240 annually. Last year it was decided to use 73% concentration at a cost of $65,390 . . . a saving of $2,850 in the first year.

The cost of equipment and installation necessary to effect such savings ran $2,650 . . . or a return of 108% on investment the first year alone!

In addition to the savings in Caustic Soda purchase, such as reported at the left, many manpower dollars are saved because 73% requires less unloading time, for fewer cars are needed to supply the same tonnage.

The unloading method utilized with 73% combines unloading and diluting in a single operation. The assembled unit is compact and relatively inexpensive.

Columbia-Southern's technical staff will be glad to make recommendations regarding the cost and location of the unit and will assist you with the unloading of the initial shipment. Write today for further information. You may realize important savings by switching from 50% to 73% Caustic Soda.

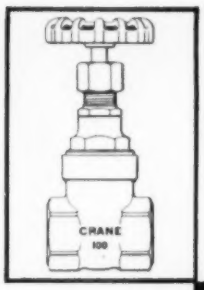
COLUMBIA-SOUTHERN CHEMICAL CORPORATION

SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY

OFFICES IN PRINCIPAL CITIES

CAUSTIC POTASH IS SUPPLIED FROM COLUMBIA-SOUTHERN'S PLANT AT CORPUS CHRISTI, TEXAS

NEW* brass gate valves by CRANE



No. 410,
100-Pound

No. 438,
125-Pound

No. 437,
150-Pound

* NEW SHAPE... NEW STRENGTH

for 3 All-Time CRANE *favorites*

Here are valves that didn't have to be changed . . . because each has long been the best in its class. But Crane found ways of improvement to give you an even better buy for your brass valve dollars.

For example—here is greater strength, greater rigidity, made possible by the new cylindrical upper body . . . the same basic shape as high-pressure steel valves. Here, too, is an improved stuffing box that screws *into* the bonnet—also better stem support to assure truer alignment and minimize wear on the packing.

And not to be overlooked is their clean, modern appearance—a very desirable advantage for all of your "exposed" installations. Sizes ¼ to 3 in. Ask your Crane Representative all about this improved brass valve line next time he calls.

just off the press...
new four-page folder with complete facts including sizes, prices and dimensions. Send for yours today. Ask for Brass Valve Folder AD1944.

THE BETTER QUALITY...BIGGER VALUE LINE...IN BRASS, STEEL, IRON

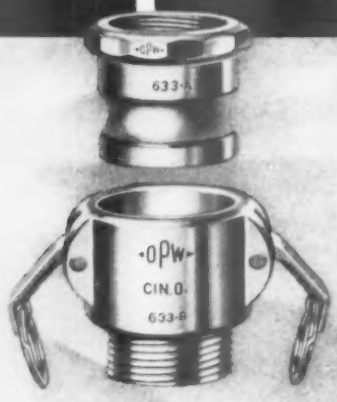
CRANE VALVES

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Illinois
Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

The Fastest, Surest Coupling Known

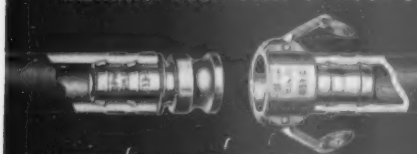
KAMLOK quick couplers



INDUSTRIAL HOSE LINES
TANK TRUCK FUEL DELIVERY MARINE SERVICE

Make field repairs quickly with this simple attachment of hose to KAMLOK shank type adaptor and coupler by using hose clamps. Leak-proof, light weight, easy to handle.

ALL KAMLOKS COUPLE AND UNCOUPLE INSTANTLY REGARDLESS OF HOOK-UP.



KAMLOK'S POSITIVE SEAL ALL ALONG THE LINE ASSURES GREATER SAFETY IN HANDLING ALL TYPES OF LIQUIDS.

Excellent hose has been condemned too often because of inferior couplings. To eliminate twisting, kinking, and straining, to add extra life and endurance to your hose use a good coupler . . . use KAMLOKS. Available in any combination to meet coupling requirements in sizes from ¾" to 3" precision machined of special hard wear resistant bronze. 4" size of OPALUMIN.*

OPW CORPORATION
2731 COLERAIN AVENUE
CINCINNATI 25, OHIO

*OPW bi-tensile aluminum alloy.

FREE BULLETIN F-10 HIGHLIGHTS IN DETAIL KAMLOK's QUICK, TIGHT SEAL.

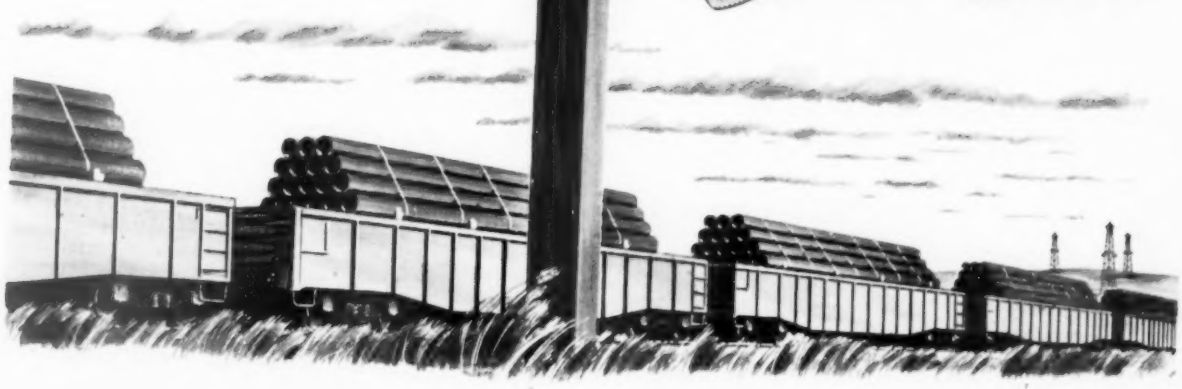
CONSTRUCTION AREA

EL PASO NATURAL GAS COMPANY IS BUILDING A NEW PIPELINE FROM PERMIAN BASIN OF WESTERN TEXAS TO BRING MORE GAS TO ARIZONA AND CALIFORNIA USERS. AIDING IN ITS COMPLETION IS DEPENDABLE DELIVERY OF BASALT-KAISER STEEL LINE PIPE.

MORE EVIDENCE THAT...

It's good business to do business with

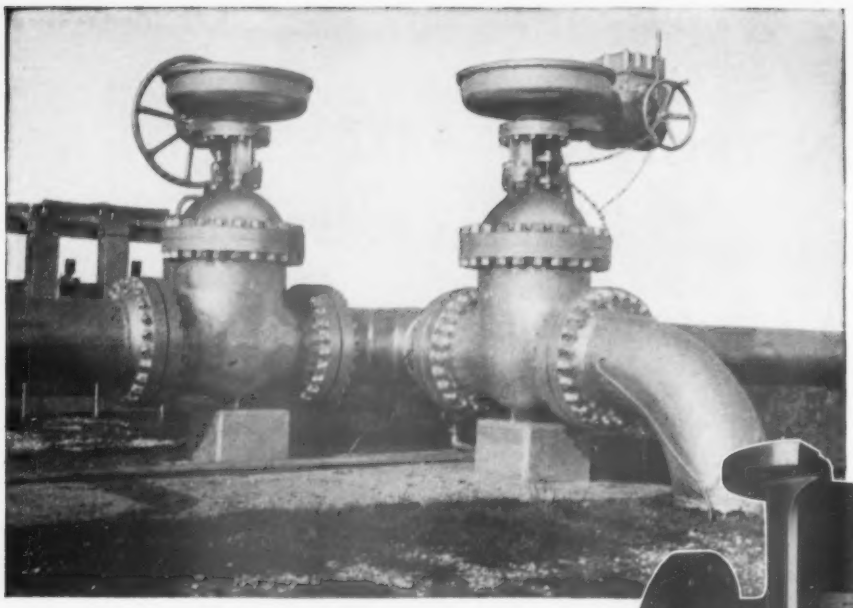
Kaiser Steel



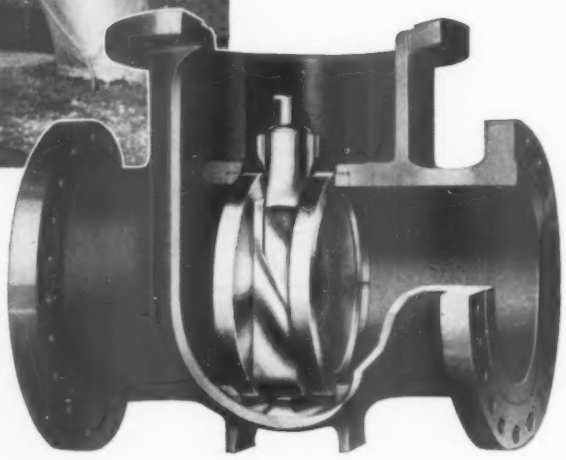
KAISER STEEL PIPE SPECIFICATIONS • All pipe manufactured to latest A.S.T.M. and A.P.I. specifications

Type	Diameter	Length	Wall Thickness	Shipping Point
Continuous Weld—Threaded and Coupled	½" to 4" nominal I.D.	Uniform 21'	Standard	Fontana, Calif.
Continuous Weld—Plain End	2⅜" to 4½" O.D.	Up to 40'	Standard	Fontana, Calif.
Electric Resistance and Fusion Weld—Plain End	14" to 18" O.D.	Up to 40'	.250" to .500"	Napa, Calif.—Basalt-Kaiser
Electric Resistance Weld—Plain End	5⅝" to 12¾" O.D.	Up to 55'	.188" to .375"	Fontana, Calif.
Electric Fusion Weld—Expanded—Plain End	20" to 30" O.D.	Up to 40'	.250" to .500"	Napa, Calif.—Basalt-Kaiser

Prompt, dependable delivery at competitive prices • KAISER STEEL CORPORATION Los Angeles, Oakland, Seattle, Portland, Houston, Tulsa, New York



Darling 20" fully revolving double disc, parallel seat cast steel gate valves, with manually and motor-operated bevel gear, installed on a major line.



Darling cast steel pipe line gate valves

Rated tops at keeping out of trouble!

IT won't cost you a cent to find out *why* you stand to save plenty with Darling pipe line gate valves on the job. Aside from extra rugged, stress-proved construction throughout, it's Darling's unique fully revolving double disc, parallel seat principle that *really* pays off!

Take a close look at the cutaway view. The rugged, self-adjusting wedges *automatically* seat the fully revolving, no-pocket discs, assuring tight, easy closure. Coupled with uniform wear distribution, these valves do a better job and last longer with less attention, less maintenance.

If it's proof of performance you're after, check with some of Darling's pipe line users. Meanwhile, you are welcome to a descriptive bulletin giving *all* the money-saving facts. Darling gate valves are available in all pressures and various constructions for main line, gathering, manifold, tank farm and all other services.

for plus values job-proved again and again

DARLING VALVE & MANUFACTURING CO.

Williamsport 1, Pa.

Manufactured in Canada by Sandilands Valve Manufacturing Co., Ltd., Galt 19, Ont.

AUTOMATIC PIPE HANDLING UNIT ON THE RIG...
CAT* ELECTRIC SETS IN THE DOGHOUSE

Round trips are made on this rig without drill pipe being touched by hand! A major oil company is operating this rig, with an improved type of automatic pipe handling equipment, near Monahans, Tex.

And in the doghouse are two Caterpillar D8800 Electric Sets to provide the dependable electric power so important to this installation.

The automatic pipe handling unit was devised to eliminate fatigue of rig crews and increase speed, efficiency and safety. It represents great labor-saving, time-saving progress in the oilfields. In many ways, Caterpillar Electric Sets are similar.

For one thing, these dependable electric sets are practically adjustment-free and are built for long years of trouble-free productivity. There are 12 sizes to 315 KW including six self-regulated models from 21 to 100 KW. In other words, there is a Cat Electric Set for your particular needs.

Parallel operation is simple. And remember, by teaming up two or more Caterpillar Electric Sets you can run all the sets when the load is heavy and only one unit when the load is light. You can shut down one unit for normal maintenance, too.

Specify Cat power in the new oilfield equipment you buy. And when it's time to re-power, it's time to see your Caterpillar Dealer. He has a complete line of performance-proved oilfield engines – and with them goes the benefit of quick, reliable 24-hour service wherever you are.

Caterpillar, Peoria, Illinois.

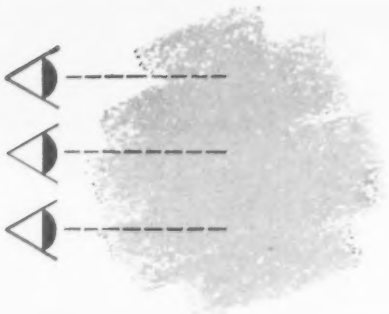
CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks – ®

WE'VE MADE CLAIMS... NOW MAKE US PROVE THEM

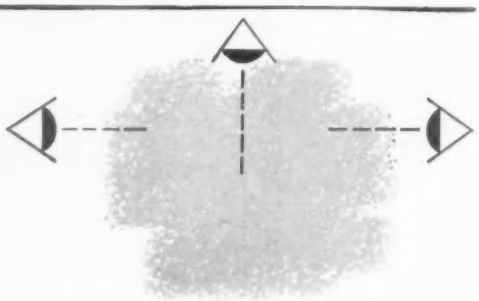
3-way analysis....

EXAMINATION
DIAGNOSIS
PRESCRIPTION



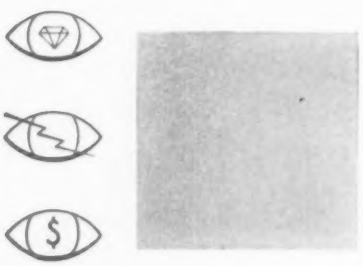
from 3 angles..

EFFICIENCY
SUITABILITY
COST



to gain 3 benefits.....

QUALITY
OUTPUT
ECONOMY



when you use Republic 3-Dimension Metallurgical Service

Fuzzy production problems shape up nice and square when the Republic Field Metallurgist and the Republic Mill Metallurgist and the Republic Laboratory Metallurgist all put to work their combined knowledge of alloy steels and heat-treatment and machining. Scores of Republic customers are making better products at greater rates and lower cost because they called in a Republic Field Metallurgist. It may be an idea *you* could use to your benefit!

REPUBLIC STEEL CORPORATION
Alloy Steel Division • Massillon, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department:
Chrysler Building, New York 17, N.Y.

Republic **ALLOY STEELS**

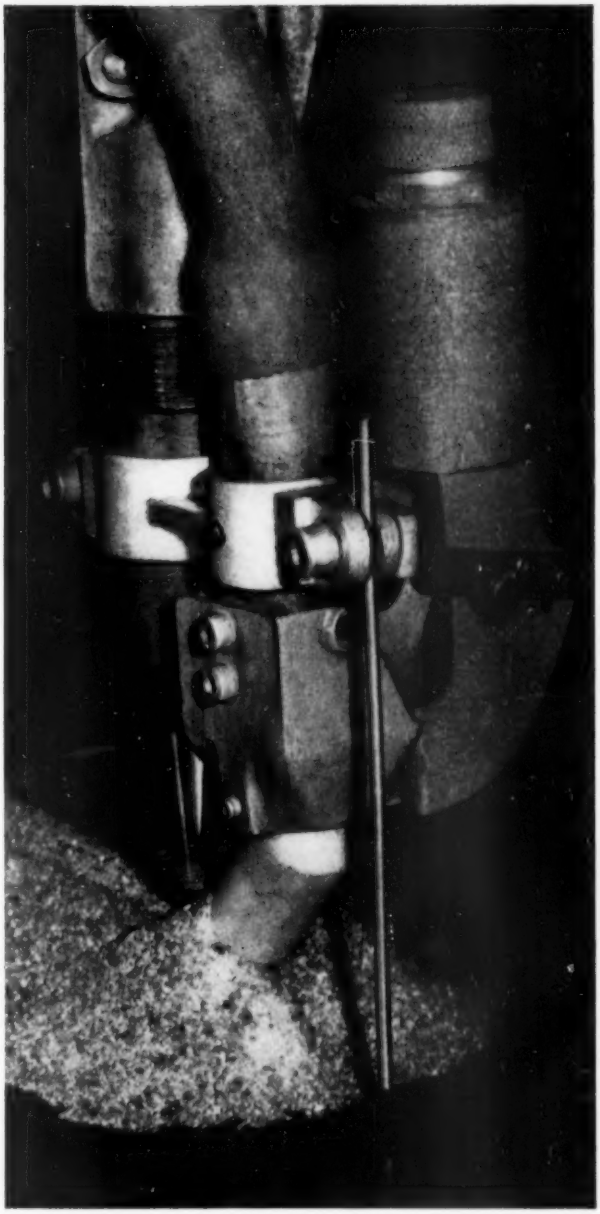
REPUBLIC STEEL

Two important parts of

UNIONMELT WELDING

Trade-Mark

You Can't See



This is UNIONMELT welding—instantly recognized by the special granulated material you see blanketing the weld. *You can't see* the powerful electric arc that fuses the metal beneath at the highest production rate attainable. No sparks or glare disrupt nearby plant activity.

You can't see the LINDE SERVICE that stands behind every UNIONMELT installation to assure its efficient and profitable operation. Only LINDE can give you this unique combination of research, engineering, and over 40 years of welding know-how that is helping LINDE customers save money and improve production. And only LINDE can give you the accumulated benefits of more than 18 continuous years of development, field testing, and improvement in the field of submerged melt welding where it pioneered.

LINDE's Service Engineers will gladly help you design a UNIONMELT installation to meet your exact requirements. They will also be available to help you when a tough production problem comes up. Call your nearest LINDE representative today.

Linde

TRADE-MARK

LINDE AIR PRODUCTS COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
Offices in Other Principal Cities
In Canada: DOMINION OXYGEN COMPANY, LIMITED, Toronto

The terms "Linde" and "Unionmelt" are registered trade-marks of Union Carbide and Carbon Corporation.

The Greatest Gasoline Development in 31 Years

TCP*, a Shell discovered additive now blended into Shell Premium Gasoline, sets the pace for the fuels of tomorrow. It's another milestone in Shell's petroleum research.

The long-recognized problem of power loss due to combustion by-products has been solved by Shell research. No longer need these by-products cause the waste of fuel and power associated with missing spark plugs and with pre-ignition.

Shell research has discovered and developed a fuel additive now in Shell Premium Gasoline—called TCP. This additive actually changes the character of harmful deposits *within the engine* so that faulty spark plug operation and pre-ignition are eliminated promptly—often during the second tankful. Old *and* new engines benefit alike.

Shell TCP additive was originally developed for aviation fuels. Up until now it has been restricted to military planes. Without question it is the greatest fuel development since the introduction of tetraethyl lead in 1922.

Important as TCP additive is for cars today, perhaps the greatest significance is its great promise for the future. TCP additive points the way to lighter, more powerful engines—engines with much greater design efficiency than has heretofore been possible.

TCP is Shell's trademark for this additive. It is another example of the progressive research that goes forward day and night in Shell laboratories. It is evidence again that Shell research provides more and better products from petroleum.

*Patent applied for

SHELL OIL COMPANY

SHELL

ALL FORGED STEEL

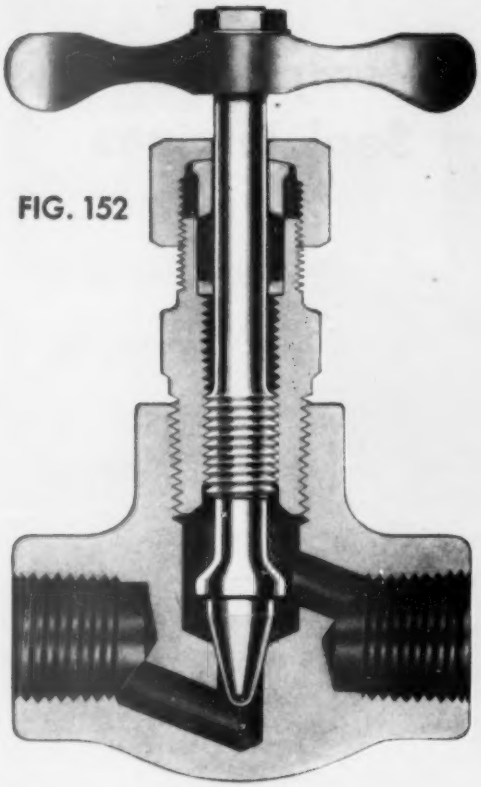


FIG. 152

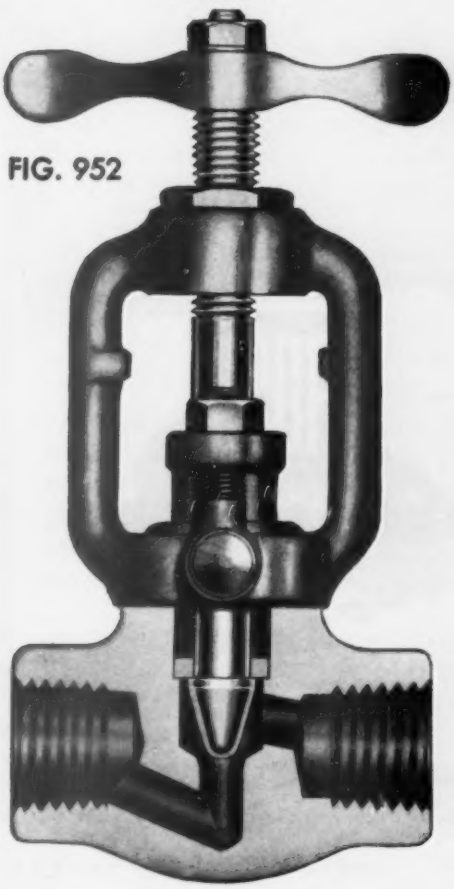


FIG. 952

Edward

GAGE and INSTRUMENT VALVES —*for sure, low-cost protection*

One of these two compact Edward Valves will solve your instrument, meter or gage valve problem, at a price far less than you would expect to pay—in both you get the extra strength of all forged steel construction at bar stock prices. Thousands now used on orifice meters, instrument panels, oil field Xmas trees, hydraulic systems, vent lines, regulators, gage lines, drip and drain lines, pressure recorders, corrosive lines and many other services.

FIG. 152 GAGE VALVES For services where excessively high temperature or pressure requirements do not exist, these moderately priced Fig. 152 valves provide an economical, dependable answer. Rated for 4000 psi at 150F or 600 psi at 750F. Furnished in globe or angle styles in sizes from ⅛ in. to 1 in. Construction features include:

- tight tapered body-bonnet joint
- semi needle stem-disk for fine regulation
- bonnet and packing nut plated to reduce galling and corrosion
- wide seat joint for tight seating
- furnished in three different body materials—carbon steel; all parts 13% chromium steel; or all parts 18-8 stainless steel

FIG. 952 INSTRUMENT VALVES Rated for 6000 lbs WOG at 100F or for 1500 psi sp at 850F, these extra strength forged steel valves give dependable protection and precise regulation for instrument, meter, and gage services involving excessive temperatures or pressures. Also furnished in 13% chromium stainless steel with higher ratings for corrosive services. Available in globe and angle styles in sizes from ¼ in. to 1 in. with screwed or socket welding ends. Construction features include:

- EValloy 13% chromium stainless steel stem-disk with needle point for close flow control
- forged steel EValized gland bolts that swing out of the way for easy repacking
- no bonnet joint to leak
- forged steel corrosion-resistant EValized packing gland
- special heat resistant die molded EValpak packing

For complete information on these and other Edward cast and forged steel valves, write for Catalog 104.

Edward Valves, Inc.

Subsidiary of ROCKWELL MANUFACTURING COMPANY

1492 West 145th Street, EAST CHICAGO, INDIANA

Another Product

to maintain correct lube oil temperature in these Continental Red Seal Engines

ROSS EXCHANGERS

Furnished to power draw works or built to match the exact requirements of just about any oil field application — producing, distributing or processing — Continental Red Seal Engines are engineered "to do specific jobs supremely well".

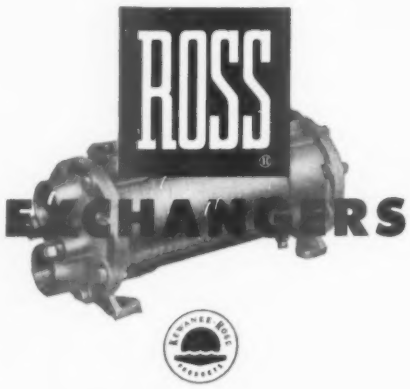
For example: To provide close clearance parts with a free-flowing supply of properly cooled lube oil at all times, Continental Motors Corporation has equipped each of the Red Seal engines, shown above, with a Ross Type BCF Exchanger. Overheating is most dependably prevented!

Unequalled for thermal efficiency and proved ruggedness — Ross Exchangers are standard components of numerous types and makes of prime equipment . . . to cool lube oil, jacket water, torque converter fluid and hydraulic oil.

Completely pre-engineered and fully standardized, Ross Type BCF Exchangers are available with "off-the-shelf" promptness in answer to most requirements.

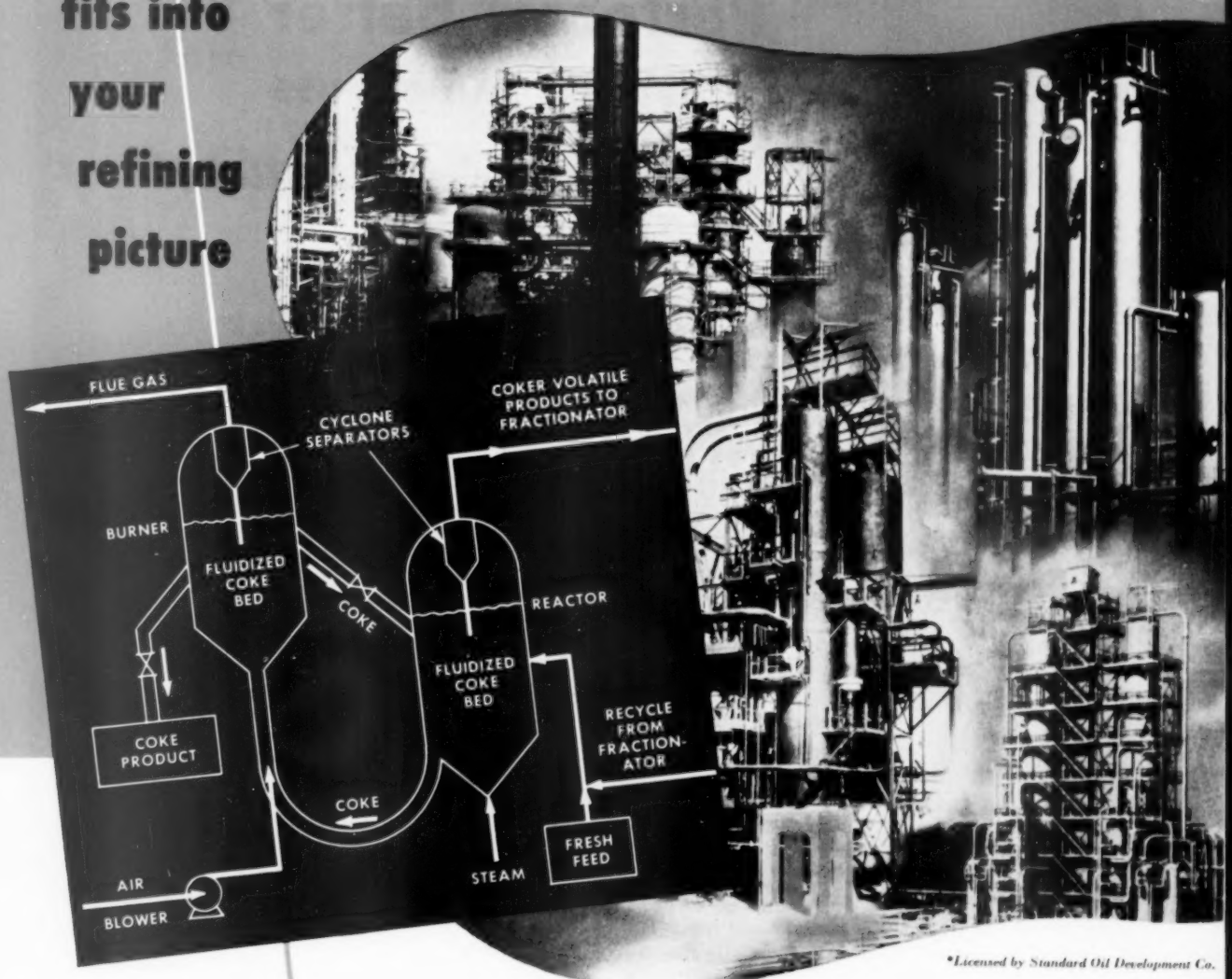
For complete information, request Bulletin 1.1K5.

KEWANEE-ROSS CORPORATION
DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION
1417 WEST AVENUE • BUFFALO 13, N. Y.
In Canada: Kewanee-Ross of Canada Limited, Toronto 5, Ont.



Serving home and industry: AMERICAN STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS • SUNBEAM AIR CONDITIONERS

Here's how FLUID COKING* fits into your refining picture



*Licensed by Standard Oil Development Co.

FLUID COKING makes profitable operations of processing low gravity crudes or residual stocks from other operations. In the preparation of catalytic cracking charge it results in a higher ultimate yield of gasoline. This new process permits charging a wide variety of feed stocks. It results in more liquid, less coke and virtually eliminates liquid residuum.

With its economical, continuous operation and low plant investment Fluid Coking will fit *profitably* into *your* refining picture.

• • •

Call on McKee for facts and figures on Fluid Coking units. Our broad experience on all types of refining facilities is at your disposal.

ENGINEERING, PURCHASING AND CONSTRUCTION FOR THE PETROLEUM REFINING AND IRON AND STEEL INDUSTRIES

Arthur G. McKee & Company • Established 1905

Headquarters: McKee Building, 2300 Chester Avenue, Cleveland 1, Ohio.
Offices: New York • Tulsa, Oklahoma • Union, New Jersey • Washington, D. C.
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Performs better
in every use because
It meets Rigid Specifications

HOW are you coating your next pipeline? Over the ditch? In the mill? In a yard or as a reconditioning job? Whatever the method, be sure to use an enamel that's *formulated to specifications* . . . and guaranteed by close laboratory and production control to meet them.

Pitt Chem Modified Enamel is just such a coating—an all-weather, all-year enamel that withstands atmospheric temperatures as low as 0°F without cracking. Underground it provides optimum protection against soil conditions and elevated service temperatures.

When you use Pitt Chem Modified, you can rely on better, faster coating above ground and longer-lasting protection below ground . . . because every drum meets specifications. Write today for data sheets . . . or any other help you need to improve your pipeline protection.

- Standard Grade Tar Base Enamel
- Modified Grade Tar Base Enamel
- Plasticized Grade Tar Base Enamel
- Cold Applied Tar Base Coatings

PROTECTIVE COATINGS DIVISION
PITTSBURGH
COKE & CHEMICAL CO.
Grant Building • Pittsburgh 19, Pa.

W&D 4647

COAL CHEMICALS • AGRICULTURAL CHEMICALS • FINE CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

Me? Ride to work on wire rope?

That's right. In the course of a year this young lady may travel as much as 150 miles with the aid of wire rope that safely and swiftly whisks her elevator aloft and then just as safely returns it to ground level. It's quite likely that she gets to her job with an assist from Wickwire Rope. Here again—as in so many other fields where wire rope is used—men who manage and maintain the nation's tall buildings have learned to place unbounded faith in the safety and reliability they get from Wickwire Rope.

A YELLOW TRIANGLE ON THE REEL IDENTIFIES WICKWIRE ROPE

THE COLORADO FUEL AND IRON CORPORATION—Abilene (Tex.) • Denver
Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
PACIFIC COAST DIVISION—Los Angeles • Oakland
Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION—Boston • Buffalo • Chattanooga
Chicago • Detroit • Emlenton (Pa.) • New Orleans • New York • Philadelphia

1854

WICKWIRE ROPE
CF&I PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

Rugged, Dependable

WHELAND SWIVELS

— for long, satisfactory service

Mr. Hoyt Burckhalter, Partner (left) and Mr. Guy Pruett, Tool Pusher (right) with Wheland Swivel that has run 14 months under constant operation with one wash pipe and packing.

SIKES-BURCKHALTER DRILLING CO.
310 SIKES BUILDING
PHONE 2-4311 — 2-4312
WICHITA FALLS, TEXAS

March 18, 1953

The Wheland Company
Oil Field Division
Chattanooga, Tennessee

Attention: Mr. Gordon Smith

Dear Mr. Smith:

I have three rigs running in the southwestern part of Oklahoma and one in the Sandusky area near Sherman, Texas.

Our work is mostly contract work with some interest work too. We have Wheland Swivels and Rotary Tables on two of the large rigs with which we are very well pleased. One Wheland E200 Swivel ran for 14 months in the southwestern part of Oklahoma under constant operation with one wash pipe and packing.

We are very satisfied with Wheland equipment and believe it to be the best.

Very truly yours,

Hoyt O. Burckhalter

HOB:FD

4 WHELAND SWIVEL SIZES

Model E-6100—capacity 115,997 lbs. at 100 RPM
Model E-6200—capacity 191,424 lbs. at 100 RPM
Model E-6600—capacity 243,487 lbs. at 100 RPM
Model E-7000—capacity 326,353 lbs. at 100 RPM

(at 3,000 life hours)

Complete details on request

WHELAND

THE WHELAND COMPANY, CHATTANOOGA, TENN., U. S. A.
ROTARY DRILLING MACHINERY

DRAWWORKS • SLUSH PUMPS
ROTARIES • CROWN BLOCKS
TRAVELING BLOCKS • SWIVELS

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EXPORT DISTRIBUTOR: Lucey Export Corporation, 233 Broadway, New York 7, New York — Broad Street House, London, E. C. 2, England

THE BIW MAN IS STILL A GOOD MAN TO KNOW

If your father was in oil in West Texas, when one great field after another was being brought in, he can tell you about BIW equipment. He can tell you that BIW equipment is engineered to do its job a little better. And he can show you hundreds of wells still in operation with BIW well head assemblies that have justified the faith of the men who installed them.

Then, as now, BIW drilling and producing equipment is engineered and built for the years ahead — for the life of the well. The toughness that was built into the equipment for West Texas is still a hallmark of the **new** Beaumont Iron Works Company.

For at Beaumont Iron Works we are still building for the years ahead. We are still building to justify your faith in this, one of the oldest companies in the oil fields.

BIW

BEAUMONT IRON WORKS
BEAUMONT, TEXAS
Subsidiary of American Locomotive Co.
General Sales Office: 1404 Dunlavy St.,
Houston 19, Texas
Warehouses in Beaumont and Odessa

ANOTHER LEADING OIL PRODUCING AREA WHICH HAS DEPENDED ON BIW EQUIPMENT.

To the Weaver, the Baker, the Beauty Maker

Rub-A-Dub-Dub, want a suit you can scrub, face cream, or a well-protected loaf? Then we can help you, for Standard Oil Company of California has put oil to work for the weaver, the baker, the beauty aid maker—and practically everyone else. In addition to supplying 88% of the 7 Western states' energy, oil men have a hand in providing you with thousands of other things you *don't* buy in a service station. Suits, for instance! That wrinkle-resistant model you may be wearing was woven from an oil-born ingredient developed in our research laboratories. Bread, too! Millions of loaves were wrapped last year in paper coated with Standard wax. Whenever you light a candle, polish a shoe, or empty a milk carton, you may be using wax turned out by Standard Oilers. And when your wife creams her face we're involved, too. Each year we supply ½ million gallons of highly-refined oils to cosmetic makers—enough for 10 million jars of face cream. These examples of oil's place in modern living emphasize one important point: The oil industry has moved from kerosene to synthetic fabrics in one short generation—and so have you. Oil progress is *your* progress.

What comes from a drum of oil? Auto tires, medicines, nylons, detergents, plastics, paints, insecticides, cleaning fluids—and thousands of other products. And that's because oil companies like Standard invest millions each year to find new ways to make oil serve you better. *Your questions or comments about our Company or industry are always welcome. Write: Standard Oil Company of California, P. O. Box 3495-E, San Francisco, California.*

STANDARD OIL COMPANY OF CALIFORNIA

plans ahead to serve you better

HALLIBURTON'S *Amplified* CALIPER LOG

takes guesswork out of well completions !

Running amplified logs with the Electric Caliper is providing operators with valuable data that minimizes expensive guesswork in well completions.

Scale selections obtained by amplifying laterally with Halliburton's Electric Caliper permit calculations of mud cake thickness, precise bed boundaries, and correlation with temperature and electrical logs.

The Electric Caliper has four spring-driven arms that contact the bore hole wall and transmit desired data to a rheostat in an oil-filled chamber where it is film-recorded as a caliper log at a speed of about 200 feet per minute.

Other information acquired with the versatile Caliper also is a vital aid in determining the amount of cement required behind casing, for plugging back hole, side wall coring, acidizing, packer setting, casing perforation, and a variety of additional downhole jobs.

Next time, take the guesswork out of well completion with this amplified log. Use Halliburton's Electric Caliper – a worthwhile low-cost investment – to gain accurate well data. Phone your nearby representative. Or contact Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

HALLIBURTON

YEARS AHEAD IN WELL LOGGING TECHNIQUES!

MATCHED

NEW YORK BELTING & PACKING CO. • Founded 1846

This emblem represents a complete line of Oil Country rubber goods second-to-none in quality . . . first in service.

PROPER V-BELT INSTALLATION

. . . is of great importance for trouble-free and most economical performance. A New York Belting & Packing Company V-Belt Specialist is available to apply his experience toward correct installation of Test Special matched sets on your V-drive. This service is available through any Continental Store. Use it. You'll save operating costs.

THE CONTINENTAL SUPPLY COMPANY
General Offices: DALLAS, TEXAS
Representatives in All Principal Oil Fields of the World

. like peas in a pod !

TEST SPECIAL V-BELTS

by NEW YORK BELTING & PACKING COMPANY

You get maximum V-drive performance and longer service life when you use a matched set of Test Special V-Belts. Even distribution of load is the reason.

Matched sets — and *only* matched sets — are always available at all Continental Supply Stores.

Also for Better Rig Performance:

GREEN TRIANGLE 3-BAND ROTARY HOSE

The rugged balanced construction provides the "Important Three" for dependable performance — STRENGTH . . . FLEXIBILITY . . . DURABILITY.

CONTINENTAL

SERVING THE OIL AND GAS INDUSTRIES

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...in a hurry

Rushing to completion this winter is the new Maiquetia-Caracas *autopista*, slashing through mountains to bring the airport within 20 minutes of this energetic city which is going modern in a hurry.

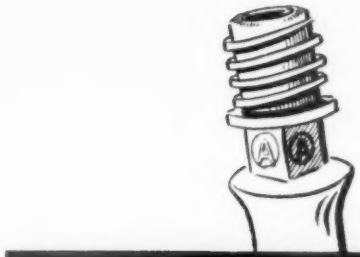
Rushing to Caracas every evening from New Orleans is a Delta-C&S luxury Constellation, favorite from the heart of U.S.

Every Constellation carries an air-freight Speed-pak, with capacity of 8000 lbs. and lengths to 30 ft.

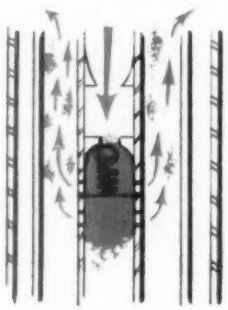
Delta-C&S AIR LINES

Offices in Principal Oil Centers

IF CORROSION or PARAFFIN IS YOUR TROUBLE —



You Need... **HOLLOW SUCKER RODS**



A cross-over nipple with a ball check valve is used at the bottom of the Hollow Sucker Rod string. The inhibitor or hot oil passes through the ball check valve into the annulus between tubing and rods. The valve also prevents any back flow of oil.

Contact your nearest Wilson Supply Company Store for complete information on these rods or write.

The use of Hollow Sucker Rods has definitely proven to be the best method to get the maximum effectiveness from any corrosion inhibitor.

With Hollow Rods you can continually inject the inhibitor into the fluid body at the top of the pump—and KNOW that both tubing and rods from pump to surface get the benefit.

By circulating hot oil through a Hollow Sucker Rod string below the maximum depth of paraffin deposits—the paraffin is melted and flushed out with the oil. This is done without shutting down the well.

WILSON SUPPLY COMPANY

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TEXAS—Alice, Corpus Christi, Victoria, Bay City, Columbus, Barbers Hill, Liberty, Beaumont, Kilgore, Monahans. LOUISIANA—Lake Charles, New Iberia, Houma, Harvey, Shreveport.

1301 CONTI ST.

(Corner of Walnut)

HOUSTON, TEXAS

SALES OFFICES:

Tulsa, Dallas, Corpus Christi, New Orleans, Shreveport, Lake Charles

For a dependable source of pipe and tubing—

Remember... call TEX-TUBE first

Tex-Tube has a complete stock of pipe and tubing for all industries on hand at all times. This new crane runway, installed recently at Tex-Tube's yards, speeds up handling and delivery of pipe.

Another step in Tex-Tube's progress to leadership in the pipe supply field.

TEX-TUBE INC.

1504 OLIVER ST. • CH-6411 • HOUSTON, TEXAS

They Say—

Williston Basin a Noncompetitor

"To date, there has not been sufficient oil-producing capacity developed in the Williston basin to fill an economic-size pipe line—one handling 100 to 200 thousand barrels per day.

Furthermore, the potential purchasers in the Midwest, California, and the Northwest are already amply supplied with crude. Since a pipe line built to Chicago, Seattle, or San Francisco would extend 1,000 to 1,500 miles and cost . . . 60 to 100 million dollars, it may be some time before such a line will be built.

"A number of pipe-line schemes have been proposed, but nothing of substance has yet taken form. Until a pipe line is built, the Williston basin fields will be unable to compete economically with those in older producing states and, as a result, will be temporarily restricted to supplying local markets."

I. E. Swearingen, general manager of production for Standard Oil Co. (Ind.), addressing the Montana Education Association, Miles City, Mont.

Future Grants to Iran Foolish

"Since the fall of Premier Mossadegh in August the United States has granted the Iranian Government $45 million in addition to smaller sums that are being used for technical assistance and similar purposes. But it would be foolish for us to go on giving or lending millions to Iran while a liquid asset remained unused in the ground. We may assume that Premier Zahedi was reminded of this fact when the recent grant was made. At any rate, he acts as though that were the case."

From an editorial in the New York Times.

Arkansas Production Leveling Off

". . . Crude-oil production in south Arkansas has hit a plateau and will go neither uphill or downhill very soon.

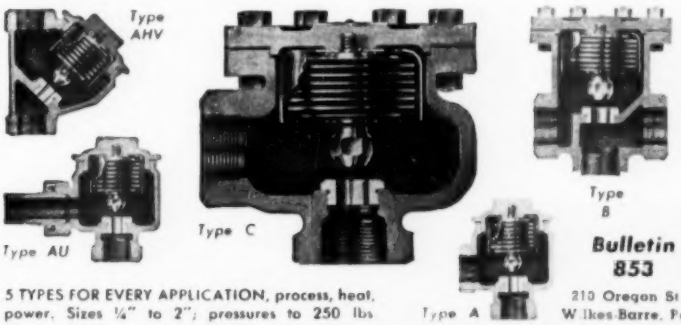
"Because so much of the crude available is already refined in the state and used in the state, and because we already export both crude oil and products, I could not anticipate that there would be so much more expansion of petroleum refining.

"While commercial production of crude oil is, and always has been, confined to the southern counties, the whole Arkansas Valley in west-central Arkansas is similar geologically to the

NICHOLSON STEAM TRAPS

CUT HEAT-UP TIME 48%

A large processor recently reduced the heating cycles of cookers from 105 min. to 50-60 min., by substituting Nicholson thermostatic steam traps for a mechanical type. This effected a gratifying production increase of 37%. Reasons for Nicholson's faster heat transfer: operate on lowest temperature differential; 2 to 6 times average drainage capacity; maximum air venting. To learn why an increasing number of leading plants are standardizing on Nicholson thermostatic traps send for our catalog.



5 TYPES FOR EVERY APPLICATION, process, heat, power. Sizes ¼" to 2"; pressures to 250 lbs

Bulletin 853

210 Oregon St. Wilkes-Barre, Pa.

W. H. NICHOLSON & CO.

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"FLINT—YOUR STEEL DEPARTMENT STORE"

A COMPLETE SERVICE:
STEEL
FABRICATION
ERECTION
DETAILING

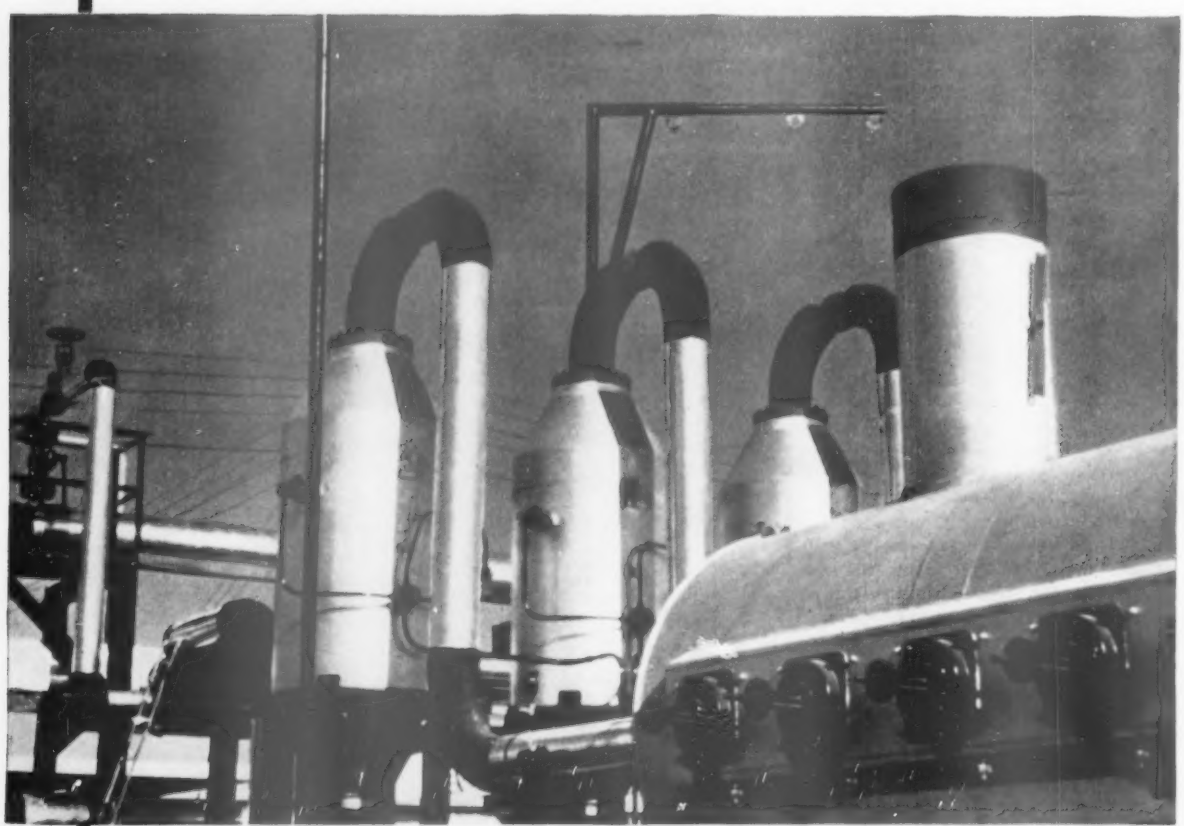
Practically any industrial steel product or fabrication facility you need is conveniently secured at Flint! GALVANIZED and STRUCTURAL steel for heavy construction jobs, transmission towers; WAREHOUSE steel including hot and cold rolled bars, sheets and structural shapes; PLATE steel for petroleum processing and chemical equipment.

SERVING SOUTHWEST INDUSTRY SINCE 1915

FLINT STEEL CORPORATION

TULSA MEMPHIS

CATFORMING EXCEEDS ALL



McBride Refinery's Catforming unit at La Blanca, Texas

IN CATALYTIC REFORMING

IT'S THE CATALYST

PLANT GUARANTEES!

McBride Catformer completes initial run. Here are the startling results:

- In its initial run, all guarantees—including throughput, catalyst life, and yield octane—were exceeded.
- Starting with a 30 octane, C4 to 400° F. end point naphtha, the McBride-reformed gasoline has met final gasoline specifications throughout its entire running.
- No expensive feed preparation or product treating is required.
- The ability to regenerate the catalyst in place has been successfully demonstrated at McBride.

DO YOU HAVE YOUR COPY?

This complete bulletin tells the whole story about Catforming. Make sure you get your copy. Write The Atlantic Refining Company, Research and Development Department, P. O. Box 8138, Phila. 1, Pa. (Telephone HO ward 5-2345.)

THAT COUNTS

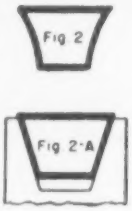
ATLANTIC

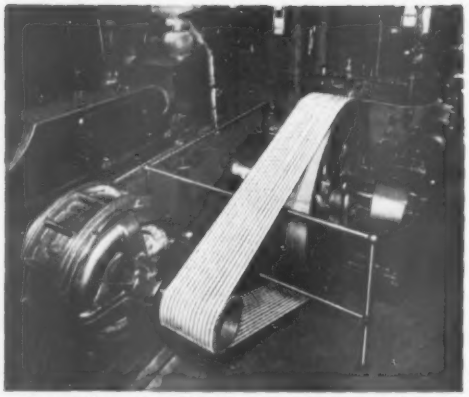
To see how the CONCAVE SIDE lengthens Belt Life...

—take any *straight-sided* V-Belt (Fig. 1). Bend it—as if it were going around a pulley. The sides will at once *bulge out* (Fig. 1-A)—and this causes *extra wear* where the bulge is greatest. (See arrows.)

Now bend a Gates Vulco Rope with CONCAVE SIDES (Fig. 2)

You will see the precisely engineered CONCAVE SIDES fill out to an exact fit in the sheave-groove (Fig. 2-A). The sides press *evenly* against the V-pulley. All wear is distributed *uniformly* across the *full width* of the Gates Vulco Rope—and this means longer belt *life* and *lower* belt *costs* for you.





Typical Gates Vulco Rope Drive—the Gates V-Belts are built with Concave Sides to insure longer belt wear.

When you buy V-Belts, be sure to get the V-Belt with the CONCAVE Sides—the Gates Vulco Rope!

Gates Engineering Offices and Jobber Stocks are located in all industrial centers of the United States and in 71 foreign countries.

CS-5311

V-Belts—Hose
Molded Rubber Goods
for Industry
World's Largest Maker
of V-Belts

Gates® VULCO ROPE DRIVES

THE GATES RUBBER COMPANY • DENVER, U.S.A.

north Mississippi area where oil is now being produced out of the Knox dolomite.

"Recent success in Mississippi has stimulated new interest in the search for oil in the Arkansas Valley where . . . only natural gas has been produced."

Bruce Brown, president of Pan-Am Southern Corp., addressing the Arkansas Independent Oil Marketers Association, Inc., Little Rock.

Floridans Fight Over Exploration

"The future of oil exploitation in Everglades National Park may well rest on the record established by drillers for Commonwealth Oil Co., Miami.

"Actually there is very little the people of Florida or of the nation can do about oil drilling on 790,620 acres of the park because the Government agreed to honor existing leases on mineral rights when these acres were included in the park proper.

"It is over the right to drill on the remaining 374,440 acres of the park where the Government made no binding promises that a real battle still rages.

"Spokesmen for Commonwealth have insisted they will make every effort to preserve wildlife in the park area during drilling operations.

"Commonwealth's drilling crews are indeed on display for all of Florida to watch. If the equilibrium of the park is not disturbed materially, considerably less objection will ultimately be raised when the question of oil leases on the remaining acres of the national park is determined.

"On the other hand, if the controlling company carelessly permits its employes and operations to maim and destroy natural life around the site of oil exploration the hue and cry against additional leases will assuredly halt further exploitation in the park proper."

From an editorial in the Tampa Daily News.

No Atomic-Powered Autos

"An atom-powered submarine is under construction. Atom-powered ships are a distinct possibility for the future. Locomotives and airplanes may possibly be atom-powered some time in the future. But it is my best guess that you will never drive an automobile with an atomic power plant.

". . . . It's hard to imagine a car with 5 ft. of concrete around its engine. But there also is little matter of the 'critical mass.' In order to have a nuclear reaction you must have a certain amount of uranium — the exact amount is a closely guarded secret. But it probably is between 2 and 10 lb. And a pound of fissionable material

It's your concern!

✓ Performance
✓ Safety
✓ Durability

THE LELAND "PACKAGED UNIT"

The "Packaged Unit" is the combination of two great pieces of equipment . . . the Leland Oil Field Truck Body and the Tulsa Winch — the perfect team for operations requiring gin pole winching.

Ball-bearing mounted rolling tail pipe with manual locking device. Safer, faster, easier on all winching operations. Heavy duty construction will last the lifetime of the truck.

Double or single gin pole pocket settings. These settings provide a wider rolling area.

The body deck plate is flush mounted over the rear half of the body offering a tempered plate protection as heavy equipment is winched onto the truck bed. The fore part of the body is center-matched hardwood flooring.

Headache rack is fabricated of heavy duty hydraulic tubing — 2½" and 3½". This rack offers positive protection to cab and driver on all loading and unloading operations.

PARTS AND SERVICE

Among the hundreds of items available at the Leland Equipment Company you will find such well known names as: CLEVELAND Trenchers; LORAIN Shovels, Cranes, Hoes; CHICAGO PNEUMATIC Air and Electric Tools, Compressors; TULSA Winches; CMC Pumps, Mixers; BLAW-KNOX Clamshell Buckets, Forms, Bins and Batchers; DORSEY Low Bed Heavy Duty Trailers. A tremendous inventory of parts is maintained for your convenience, among which are: CLEVELAND, THEW-LORAIN, CHICAGO PNEUMATIC, and TULSA WINCH.

OKLAHOMA CITY
TULSA
LONGVIEW, TEXAS

Leland
EQUIPMENT COMPANY

Why should you consider using

HERCULES Red-Strand wire rope?

Why indeed. Aren't all wire ropes alike? They look alike. Why should you choose HERCULES Red-Strand rather than any other?

The answer would be easy if you could discover by *feel* why HERCULES Red-Strand performs so well. Or if you could see, or hear, or taste the *special quality* that makes users praise it so highly. But you can't. Wire rope isn't like that.

The big reason is performance

Usually you become aware of the consistently high performance of HERCULES Red-Strand by hearing users praise it . . . or by using it yourself and checking results.

Then you realize there must be *something special* about this rope. And you are right. *There is.*

What is this something special?

It is partly the result of generations of specialization. Leschen is concerned *entirely* with making wire rope. Nothing else. No other processes or activities interfere.

It is partly Leschen's 97 years' experience and Leschen's natural ability to make good wire rope . . . which has resulted in several major "firsts" in the development and most efficient use of wire rope.

It is partly pride of craftsmanship . . . from policy to engineering to finished rope. It is the effort always to make HERCULES Red-Strand *better than we claim it to be.*

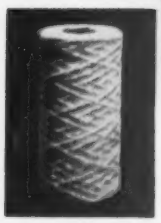
In a word, it is *quality* . . . higher-than-rated quality. This is the *something special* in HERCULES Red-Strand wire rope that means *longer-than-expected* service . . . year in, year out.

It *pays* to choose HERCULES Red-Strand. Use it and see.

LESCHEN WIRE ROPE DIVISION
The Watson-Stillman Company
(A SUBSIDIARY OF H. K. PORTER CO., INC.)
St. Louis 12, Missouri

In business only to make wire rope and slings of higher-than-rated quality—since 1857

NO MORE CLOGGED FILTERS...



SOLVE YOUR SLUDGE PROBLEMS

WITH DRIACIN

This brand new UOP sludge dispersant additive made specifically for distillate heating oils and diesel fuels

PROMOTES DISPERSION

of microscopic sludge particles . . . limits their growth . . . prevents clogging of burner screens and filters. Driacin

INHIBITS CORROSION

in transfer lines and storage tanks . . . limits total filterable sediment. In a large percentage of laboratory tests, it has been found that Driacin also

INCREASES COLOR STABILITY

Driacin samples and literature may be obtained by writing on your company letterhead to . . .

PRODUCTS DEPARTMENT

UNIVERSAL OIL PRODUCTS COMPANY

30 ALGONQUIN ROAD, DES PLAINES, ILL., U. S. A.

UOP DRIACIN

would cost you—and this is only a guess, for no accurate cost figures are available—perhaps $10,000.

"That means your atomic auto will cost $20,000 to $100,000 plus the cost of the car itself. You can pass up all the service stations, to be sure. But who wants to invest $100,000 in an automobile? A 20-gal. tank of gasoline is still highly convenient and economical package of energy.

"And how are you going to service an atomic engine? Will the mechanics stand behind concrete walls and work on the engines with long steel tongs?"

William M. Holaday, director of Socony-Vacuum Oil Co., Inc., laboratories, in the company's employe publication, The Flying Red Horse.

PAD Should Have Replacement

"Now for the past 3 years we have had the Petroleum Administration for Defense. Always there has been a hand-in-glove relationship. Government did not dictate to industry, and industry did not dictate to Government. Each worked willingly for the common good. That is something we should not lose—but we could lose it if there were no agency established to carry on in the tradition once PAD has been erased.

". . . I am not arguing for a continuance of PAD as it is today, even though it is now a small agency. PAD is still useful, but I am not sure that it is essential.

"Some sort of government oil and gas agency is essential, though. It is essential to the industry, essential to the Government, but most of all essential to the people of this nation, who depend so much . . . on oil for survival.

"I can only hope that when PAD does disappear, it will be replaced by a new agency that will be as vigorous as the old in protecting the best interests of the people as a whole."

Joseph A. LaFortune, deputy petroleum administrator, addressing the directors of the Petroleum Equipment Suppliers Association, Chicago.

Industry Not Stealing Tidelands

"An aggressive effort has been made to represent the tidelands oil controversy as an attempt by oil companies to engineer a 'big steal' of the rights to offshore oil.

"The truth is that the one and only issue in that controversy is whether the federal Government or the states concerned should have title to the tidelands area.

"There was never any question of giving oil companies title to the tidelands—nor did any oil company suggest such a thing. The oil industry expected that it would lease and develop

the underwater lands . . . regardless of the outcome of the title fight.

"Actually . . . misrepresentation of the tidelands matter was simply part and parcel of the long established campaign to discredit the oil industry in the eyes of the people of this country. It is highly unlikely that that campaign will have any marked success. For in no other country on earth have the people been given so many oil products . . . at such low prices."

Editorial in the Oil City (Pa.) Derrick.

Petrochems Improve Farm Output

"The nation's agricultural production has been greatly increased by the combined efforts of petroleum and chemistry. Spent refinery acid is used in the production of commercial fertilizers. Petroleum sprays protect crops and animals from insects. A different petroleum spray protects against fungicidal growth. Still other petroleum sprays are used for weed controls.

"It is difficult to tell how large the petrochemical industry is because it is expanding so rapidly. The sum total of plant investment in this industry is estimated to have already passed $2.5 billion. A view of the future would indicate that it may reach as much as $10 billion by the end of a decade."

John W. Boatwrgiht, general manager of the distribution economics department for Standard Oil Co. (Ind.)

Advertise Safety Projects

". . . a company's reputation for safety and for progressive elimination of hazards to public health depends chiefly upon three things: first, reporting the actual facts of an incident, when there is one; second, setting up a definite program of correction and improvement; and third, familiarizing the civic authorities, newspapers, and others concerned with the problem, with its economics and with plans for betterment."

Don Knowlton, Hill and Knowlton public relations firms, addressing the Petroleum Section of the National Safety Congress, Chicago.

Oil's Part in Filling Fuel Needs

"The people of the United States use, per capita, more energy from fuels than any society in history. I hate to think how quickly our marvelous standard of living would melt away if we had to depend on the energy of manpower and animal power alone.

"Gasoline, of course, is one important source of the fuel energy that supports life as we know it today. . . in 1953, gasoline will supply about one-sixth of the total energy from fuels used

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98 Homestead Ave., Hartford 1, Connecticut
Gentlemen: Please send me your bulletin on
☐ Exhaust Silencers ☐ Spark Arrestors
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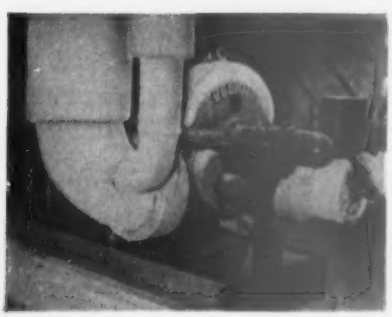
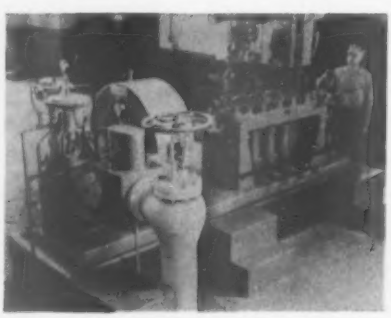
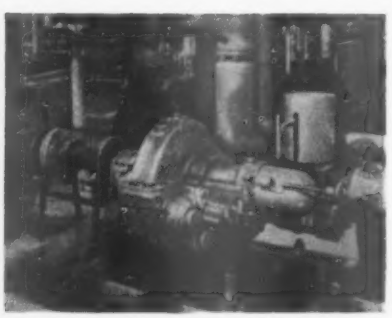
Clean, simple lines reflect the advanced engineering and manufacturing skill that has gone into building this modern, efficient turbine. It's the turbine that offers everything — adaptability, reliability, economy and a recognized reputation among plant engineers as one of the finest, most dependable turbines available anywhere.



Elliott 360-hp, 3550-rpm turbine driving a boiler-feed pump in a paper mill, exhaust steam being used in process.



Elliott 500-hp turbine driving a hydraulic system pump in a steel mill. Turbine maintains constant pump discharge pressure.



One of a group of Elliott turbines driving lean oil pumps in a cycling plant, where reliability is especially important.

A standard turbine— yet "tailor-made" to your requirements

Elliott Turbines can be adapted to practically any operating condition or service

That's because these powerful, compact turbines are designed to give you the advantages of custom-built adaptability at savings achieved through mass production of standardized parts. A wide variety of permissible modifications are possible. For instance... five sizes of YR turbines cover the entire range of capacities up to 2000 hp, speeds from 800 to 7000 rpm and back pressures from 4 in. Hg to 250 psig. Standard designs of rotor, governor, bearings, bearing cases, steam chest, governor valves and governor linkage are used throughout. In the case of higher pressures and temperatures up to 850 psig and 900 F, materials for steam parts may be changed from cast iron to steel.

Here are a few of the design highlights that are included in Elliott turbines:

Air-wall labyrinth seals to protect bearings from contamination without rubbing contact.

Centerline support to provide constant alignment under any operating condition.

Stainless steel spray coating under packing glands to eliminate corrosion of the shaft.

Choice of many governors to meet specific control requirements.

Liner type bearings to eliminate the need for scraping and fitting.

Packing glands removable without raising turbine upper half casing to simplify inspection and maintenance operations.

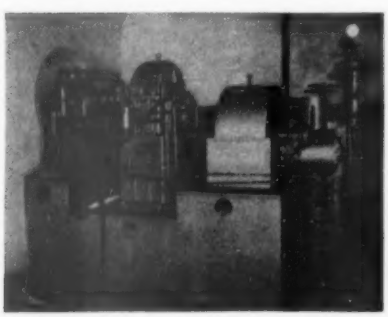
Stainless steel buckets and shroud to assure maximum life and continued high efficiency.

These and many other features are *standard* in Elliott turbines. They are the result of years of practical experience in the application of turbines to hundreds of different types of plant equipment and to many different types of operating and steam requirements.

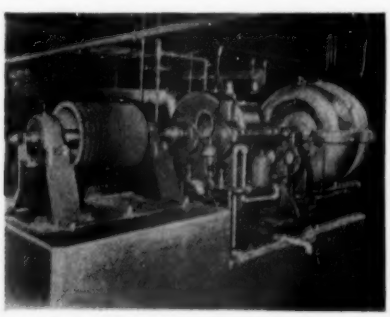
Full details on Elliott Mechanical Drive Turbines can be obtained from your local Elliott representative or by writing Elliott Company, Jeannette, Pa., for a descriptive bulletin.

ELLIOTT Company
STEAM TURBINE DEPARTMENT

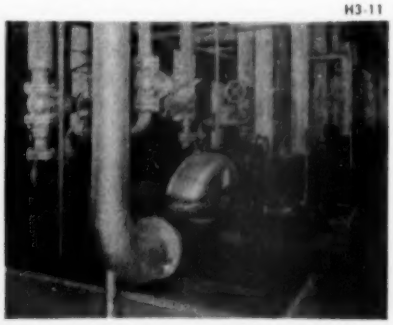
H3-11



This Elliott 202-hp turbine drives an induced-draft fan through a separate reduction gear, in a midwestern generating station.



An Elliott 250-hp geared multi-stage turbine driving a paper machine. Governor gives close regulation over a wide speed range.



This line of oil pumps is driven by Elliott turbines. This is one of many refinery applications for Elliott turbines.

an ACCO product

Why You Can Expect Longer, Trouble-Free Service

• The choice of metals used in the R-P&C Rising Stem Bronze Gate has a lot to do with its fine service record. The body is cast of high test bronze in our own foundry, the stem is high tensile rolled bronze, while the solid wedge and seat rings are nickel-alloy.

The design is important, too. The union bonnet adds strength and won't distort the valve body or threads when it is removed. Fluids don't come directly in contact with the operating threads and the rising stem shows position of the wedge. It's easy to disassemble this valve where frequent cleaning is necessary.

The **No. 716** R-P&C Bronze Gate Valve is made in sizes ¼" to 3", for 200 lbs. steam pressure at 500° F; or 400 lbs. OWG, non-shock. It is economical to buy and use.

• See your R-P&C distributor or write our Reading, Pa., office for literature

ACCO

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AMERICAN CHAIN & CABLE

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TRADE MARK

R-P&C valves

in this country. Gasoline . . . represents only about half of the total energy supplied by petroleum."

Frank W. Abrams, chairman of the board, Standard Oil Co. (N. J.), addressing the Boston Chamber of Commerce.

CALENDAR

NOVEMBER

Nov. 29-Dec. 2 American Society of Mechanical Engineers, Statler Hotel, New York City.

DECEMBER

1-4 Corrosion conference, University of Oklahoma, Norman.
5 Twenty-fourth Exposition of Chemical Industries, Commercial Museum and Convention Hall, Philadelphia.
10-12 American Chemical Society, regional meeting, southeast and southwest sections, Jung Hotel, New Orleans.
13-16 American Institute of Chemical Engineers, annual meeting, Hotel Jefferson, St. Louis.

JANUARY

11-15 Society of Automotive Engineers, annual meeting and engineering display, Sheraton-Cadillac and Statler Hotels.
12-14 National Constructors Association, annual meeting, Hotel Commodore, New York City.
27-29 Ninth annual symposium, "Instrumentation for the Process Industries," Texas A. & M. College, College Station, Tex.

FEBRUARY

26 Natural Gasoline Association of America, Permian Basin regional meeting, Lincoln Hotel, Odessa, Tex.

MARCH

1- 5 American Society for Testing Materials, spring meeting, Shoreham Hotel, Washington, D. C.
3- 5 American Petroleum Institute, Division of Production, Southwestern district, Rice Hotel, Houston.
4- 5 American Gas Association, transmission and storage conference, Jung Hotel, New Orleans.
8-10 American Institute of Chemical Engineers, Statler Hotel, Washington.
15-19 National Association of Corrosion Engineers, annual meeting, Municipal Auditorium, Kansas City, Mo.
17-19 American Petroleum Institute, Division of Production, Mid-Continent district, Skirvin Hotel, Oklahoma City.

1954

JANUARY

25-28 Plant Maintenance & Engineering Conference, Hotel Conrad Hilton, Chicago.
25-28 Plant Maintenance & Engineering Show, International Amphitheatre, Chicago.

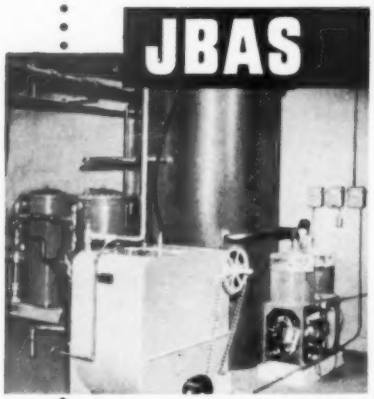
FEBRUARY

11-12 Western Petroleum Refiners Association, regional meeting, Hotel Beaumont, Beaumont, Tex.

MARCH

29-31 Western Petroleum Refiners Association, annual meeting, Plaza Hotel, San Antonio, Tex.

here's a complete WATER WORKS



in a small economy package

Here—in a small, economy package—is a complete water works to solve oil field water problems . . . whether your source of water is a creek, river, pond, lake or well. The JBAS will soften, clarify, sterilize and remove taste and odor . . . make water *right* for your particular needs. Takes little space, reduces installation cost, is simple to operate. Can easily be moved, if necessary.

Use the JBAS for . . .

- ★ FIELD CREW DRINKING SUPPLY
- ★ ENGINE COOLING
- ★ BOILER FEED
- ★ FOR STABILIZING WATER OR BRINE FOR MODERATE SIZE FLOODING OR DISPOSAL

IT'S FOR YOU . . . Bulletin 1845-0 shows and tells how the JBAS can benefit you. Write for your copy today. No charge.

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WHY W. C. NORRIS CHOSE 8627

for it's NEW SUCKER ROD TYPE 35

EDW. C. BOLGER, President

"In developing the Type 35 Sucker Rod, our engineering staff and field men talked with engineers, oil company superintendents, and others engaged in the production of oil, to determine the grade rod that would best fill their needs," according to Ed Bolger, President, W. C. Norris Manufacturer, Inc.

"The answer lay in an economically priced rod that would more greatly resist fatigue which has its start in corrosion. Metallurgical research in heat treatment to obtain a crystalline structure to resist fatigue resulted in our selection of a modified SAE 8627 alloy steel. This nickel, chromium, molybdenum alloy has corrosion resistant properties and lends itself to heat treatment that produces a grain structure of such a nature that fatigue life is greatly enhanced."

"In the Type 35, we believe we have attained the twin goal of a rod that will have both corrosion resistance and a longer fatigue endurance life."

The W. C. Norris plant — Tooled for expert production — Teamed with long experience — produces a sucker rod of the highest quality. Time and temperature of forging operation that will produce proper material flow is carefully controlled. Time and temperature in heat treatment that will produce a uniform grain structure from end to end is accurately measured.

W. C. Norris Sucker Rods are also furnished in Type 30 and Type 40 for your pumping needs.

W.C.NORRIS, MANUFACTURER, INC.

TULSA, OKLAHOMA

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THE OIL AND GAS
JOURNAL
TULSA, OKLAHOMA

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JOURNALLY Speaking

Both Work and Play

"THIS here A.P.I. is the best convention of the year. Every night club in town is full of oil men. I guess oil is the last business left in the world where a guy can start with nothing and have a chance of making a million bucks. Sure, I know it's a gamble and you might lose your shirt, but when you oil guys make a pile you sure like to come to Chicago and spend it."

The above remarks are those of a taxi driver who was returning us to the Conrad Hilton Hotel after a visit —strictly on business—in another part of the Loop. They may be typical of the average American's idea of oil men, and if so they pose some thoughts for the industry's public-relations experts.

The good side is that the public admires free enterprise and appreciates the benefits which spill over to other enterprises—not only to night clubs and taxi drivers. The bad side is the impression that all oil men are reckless spenders and playboys.

It is true that the unofficial entertainment indulged in by A.P.I. visitors would put an oriental potentate to shame, but it wasn't all play that week in Chicago. We can testify from personal observation that the business sessions were just as jammed as the night spots and open houses.

Sideshows

AS if the A.P.I. meeting itself weren't enough of a three-ring circus, there always are a lot of side shows going on at the same time. Various groups of people who have common interests get together for lunch or dinner. Some of these are quite exclusive, others not quite so much so.

For example, there is the Twenty-Five Year Club, the Pipe Liners' Club, the Nomads, the Purchasing Agents, and others. The pipe liners call their group the darnedest club in the world because they do nothing but hold one dinner a year and have no speeches, reports, or business meeting.

But we'll bet none of them equal the Association of Petroleum Writers, whose annual dinner was attended by more than 100 oil writers, public-relations men, and specially invited "friends of the press." We don't disclose the secrets of the lodge by telling what happened, but the "fellowship hour" which preceded the dinner sort of drowned out all desire for serious business and the affair was unanimously voted the best meeting of the entire A.P.I. Which just goes to prove our contention that newspapermen have more fun than anybody.

Quite Rational

HOW to make yourself understood is a problem mentioned by several speakers at the A.P.I. meeting. Max Burns of Shell told a story to illustrate how some people seem to misconstrue things deliberately.

Two Russians, he said, met at a railroad station where the trains ran to only two places, north to Minsk and south to Pinsk.

"Well, Ivan," said Serge, "you're doing a little traveling, maybe?"

"Yes, Serge," said Ivan, "I'm doing a little traveling, maybe."

"Where might you be going, Ivan?"

"I'm going to Minsk, Serge."

"Ah ha," said Serge to himself, "Ivan says he is going to Minsk. That is so I will think he is going to Pinsk. That means he really is going to Minsk, the dirty liar."

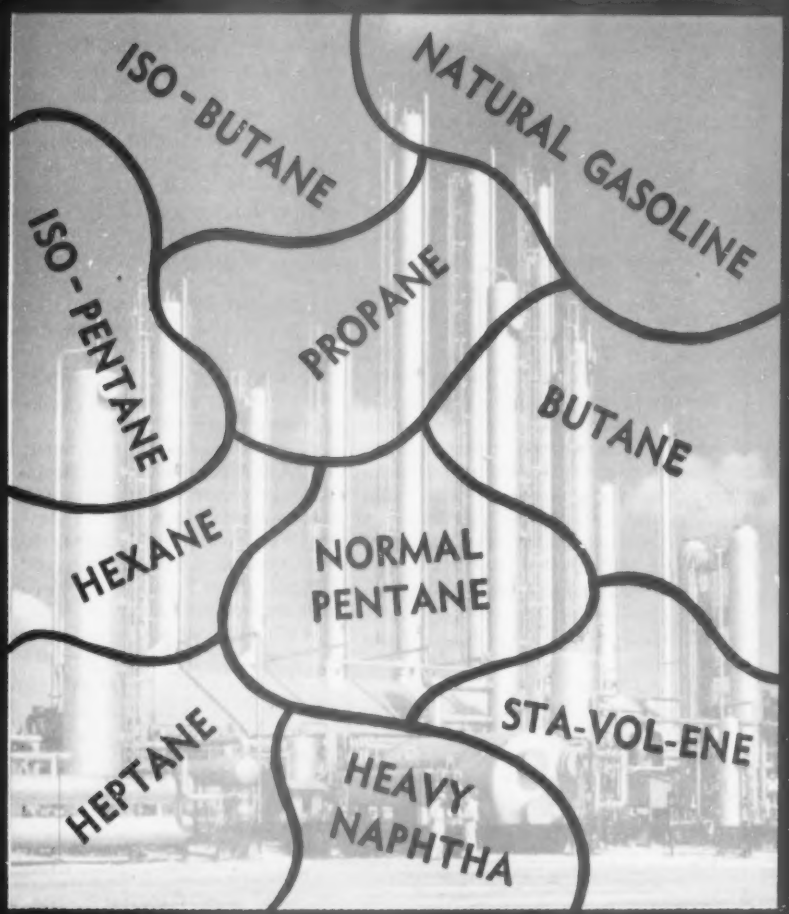
And Reese Taylor of Union Oil also had a story to illustrate the need for better interpretation of statistics:

"I'm reminded of the survey which revealed that families of the average Princeton graduate include 1.8 children, whereas the average family of the graduates from Smith College comprises 1.4 children. Without proper analysis, one could draw the faulty conclusion that men have more children than women."

Which just goes to prove another of our contentions about the writing profession, namely that this business of using words to convey ideas is as full of booby traps as an enemy mine field.

—Henry D. Ralph.

DO THESE WARREN PRODUCTS FIT INTO *Your Picture?*



NATURAL GASOLINE
PROPANE
ISO-BUTANE
BUTANE
ISO-PENTANE
NORMAL PENTANE
HEXANE
HEPTANE
HEAVY NAPHTHA
STA-VOL-ENE

WARREN
PETROLEUM CORPORATION

TULSA, OKLAHOMA CABLE ADDRESSES: Stavolene, Warren

EXPORT TERMINALS: CORPUS CHRISTI, PORT ARTHUR, BAYTOWN, TEXAS CITY AND WARRENGAS, HOUSTON, TEXAS

Excess output won't pay for excess capacity

THE big rash of local gasoline price wars in many parts of the country is a symptom of a serious internal ailment in the economic body of the oil industry.

That ailment is oversupply. It is caused by excessive refinery production of gasoline over a period of months, production well above the ability of the market to consume, above the system's capacity to digest. As a result, mounting inventories have raised the industry's blood pressure to a danger point, and the symptoms of oversupply are breaking out all over.

These local surface rashes may be little more than annoying at the moment, but they seem to be spreading. And the only way to cure them is to get at the internal source of the trouble.

DURING the past few years the refining industry has built more capacity than it needs to use at the moment. One reason for this was the military's request for standby capacity in case of emergency. The new plants are quite efficient when run at capacity.

When a refinery, or any other equipment, is operated at less than capacity the unit cost of the product goes up. So it is uneconomic to run at less than full output. But it also is uneconomic to produce more of anything than can be sold. It costs money to carry excessive inventories. And it is even more costly when the excess product has to be dumped at cut-rate prices.

So businessmen must weigh the cost of undercapacity operation against the cost of a glutted market. Refiners, over a period of months, have given the wrong weights to these factors.

NOW there is a real danger that a general break in gasoline prices will wipe out the savings of high-level output. A lower gasoline price will make it even more difficult for refiners to carry the surplus capacity built at government request. It would probably cause a cut in crude prices, making it more difficult for the producing branch of the industry to develop new reserves for the future.

Of course refiners cannot and should not get together and agree on their output. And, quite understandably, each refiner hopes that his own marketing department can move his production some way. But when a majority of them overestimate the market, the market is very apt to go bad for all. Then the men with the most stocks will take the biggest loss until supply is worked down.

It should be realized that the cost of reserve refining capacity can be borne only by including it in the price of the product of used capacity. It can't be carried by per-gallon prices forced low by overproduction.

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With two Anchor Underground Storage plants in operation and the third storage plant underway in Bath, N. Y., Anchor Petroleum Company will substantially increase their storage capacities for LPG. This means that we have a place for your gas . . . winter and summer.

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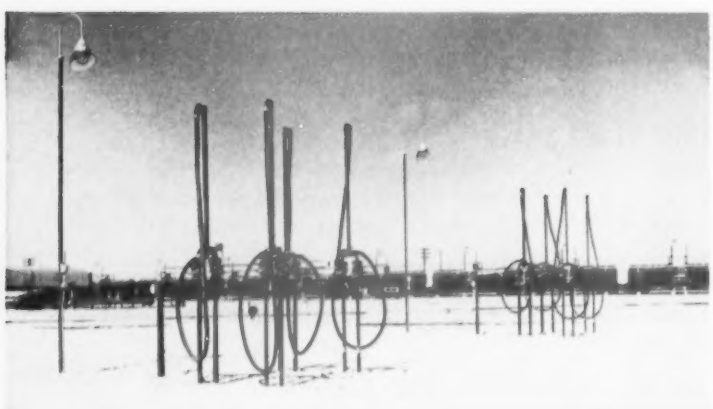


Anchorgas

The truck loading terminal at Anchor's Midland Plant is designed to load two different products at the same time.

Right: Gas is being pumped into one of Anchor's storage wells at Midland, Texas. Tank car loading rack is shown in the background.

Below: Truck loading and unloading rack at Hattiesburg. Will accommodate 4 trucks at one time.

THIS WEEK... ...IN THE NEWS

PIPE LINES—PAD estimates indicate 8,700 miles of pipe lines, both crude and products, will be completed before the end of 1953 at a cost of more than $480,000,000. . . . This represents an increase of 50 per cent in pipeline construction over last year. . . . The outlook for 1954 is for an even greater increase in product lines with a decrease in the number of miles of crude lines planned. . . .

INTERNATIONAL—Kuwait oil production tops billion-barrel mark in a period of little more than 7 years. . . . Yearly increase in output of shaikhdom threatens the position of Saudi Arabia as the leader in the Middle East. . . . ¶Batangas Bay refinery under construction by Caltex will be the first in the Philippine Islands. . . . The 13,000-bbl. daily refinery will represent an outlay of nearly $30,000,000. . . . ¶Two new fields in the Greater Oficina complex in eastern Venezuela extend the area eastward almost to the border of Monagas State. . . .

GOVERNMENT—Twenty-five synthetic-rubber plants go on sale this week. . . . Federal commission announces it will accept bids between November 25 and next May 27 in move to get plants back in private industry. . . . ¶Crude-oil imports reach all-time high, Commerce Department figures show. . . . September average was 729,200 bbl. daily. . . . ¶Major-product inventories in secondary storage also show increase during September, climbing 2,420,000 bbl. to nearly 55,000,000 bbl. . . .

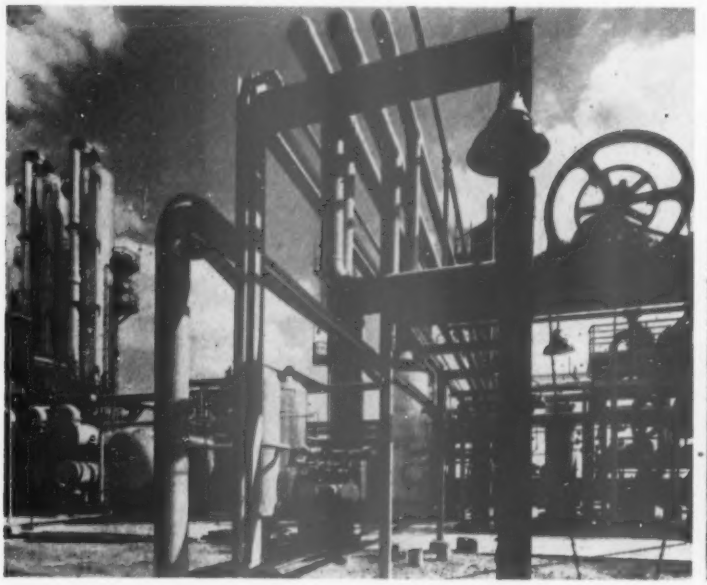
KENTUCKY STREAM crossing being lowered into place on Gulf Interstate Gas Co.'s 850-mile, 30-in. natural-gas system. This $130,000,000 system will stretch from the Louisiana Gulf Coast to northeastern Kentucky and will have a capacity of 375,000,000 cu. ft. of gas a day. Completion is scheduled next November.

INDUSTRY—An agreement between Stanolind Oil & Gas Co. and the RFC paves the way for Stanolind to take over the $50,000,000 Carthage Hydrocol, Inc., gas synthesis plant at Brownsville, Tex. . . . Stanolind will inspect the big plant and then if it decides the plan is feasible, it will take over an RFC first mortgage of $18,500,000. . . . ¶Tennessee Production Co. pays $12,789,250 for the properties of the recently liquidated Reno Oil Co. . . . ¶Deep Rock Oil Corp. acquires all capital stock of Hugoton Plains Gas & Oil Co. for $1,150,000 in cash and 20,000 shares of Deep Rock. . . .

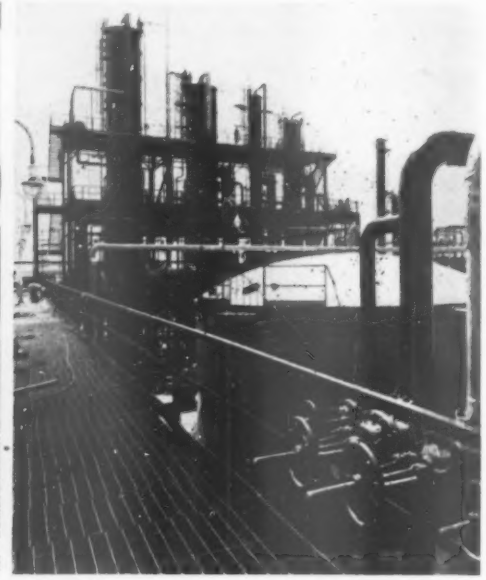
REFINING—PAD figures based on certificates of rapid tax amortization already issued point to a crude topping capacity for the nation of more than 8 million barrels by the end of 1955. . . . Figures show the small refiners will increase their capacity in a greater proportion than the large refiners and will take an increasingly more important part in the nation's refining. . . . ¶The Armed Services Petroleum Purchasing Agency is nearly swamped with offerings of products for the armed services. . . . Bids received by the ASPPA range from 113 to 591 per cent of the quantities wanted. . . .

ACTIVITY—Production of crude and lease condensate averaged 6,220,075 bbl. daily for week ended November 14, up 11,550 bbl. daily. . . . ¶Total well completions for the week decreased 84 wells to 967. . . . Wildcat completions dropped 35 wells to 198. . . . Rotary rigs increased by 25 during the week ended November 16 to 2,799. . . .

TRENDS—Primary inventories of the four major products decreased 1,107,000 bbl. for week ended November 14 after reaching a peak of 368,519,000 bbl. on November 7. . . . The peak last year came on October 18 with a total of 331,957,000 bbl. . . . Gasoline increases accounted for 21,730,000 bbl. of the difference between the two peak weeks. . . . Distillate was up 14,936,000 bbl. . . .



BASIC UNIT at Tuscola is the extraction plant, which recovers 40 per cent of the ethane and essentially all of the heavier fractions from 400,000,000 cu. ft. of pipeline gas per day.



NEW SYNTHETIC ETHANOL UNIT, with a capacity of 125,000 gal. daily or 20 per cent of current national production, is one of the largest in existence.

Huge Petrochem Plant Dedicated

National Petro-Chemicals' $50,000,000 Tuscola project hikes U. S. synthetic ethyl alcohol output by 20 per cent

George Weber

TUSCOLA, Ill.—A unique new member officially joined the petrochemical industry in mid-November as National Petro-Chemicals Corp. dedicated a $50,000,000 installation here.

Processing natural gas from the Southwest, this first major plant to be built in Illinois has added substantial new capacity in two major petrochemical intermediates.

Like many other companies entering this field, Petro has a mixed parentage. But it differs somewhat from the conventional refining-chemical ownership, in combining the assets of a leading distiller and a long-distance gas-transmission company.

National Distillers Products Corp., operator and 60 per cent owner of Petro, is a major producer of fermentation alcohol with rapidly expanding interests in diversified chemical manufacture. The other owner, Panhandle Eastern Pipe Line Co., is an oldtimer in the gas-transmission business.

The Petro plant also differs from the average petrochemical installation in its location—near to chemical markets and relatively far removed from its hydrocarbon source stocks. Located in a former corn field in East Central Illinois, this new project promises to become the nucleus of an important industrial and agricultural-chemical complex based on its output of basic and intermediate petrochemicals.

The plant . . . In its initial installation, Petro's Tuscola plant consists of five major processing units, to which two more will be added within the next 2 years. The plant site is adjacent to Panhandle Eastern's compressor station where the company's major transmission line from Hugoton gas field is joined by the subsidiary Trunkline Gas Co.'s artery from South Louisiana.

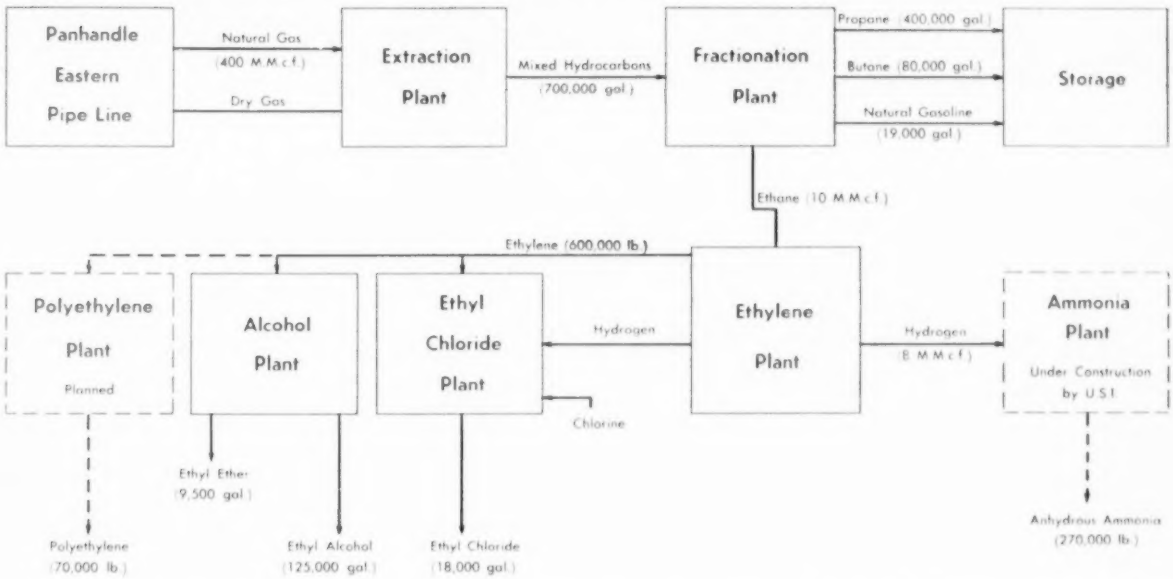
The basic unit at Tuscola is the world's second-largest gas-extraction plant, capable of processing a peak of 425,000,000 cu. ft. of gas per day for recovery of 40 per cent of the ethane content, plus essentially all of the propane and heavier fractions. (The largest is Texas' Katy gas-cycling plant, designed to process 458,000,000 cu. ft. of gas daily for part of propane-butane content and all heavier fractions.) This natural gas, originally field-processed for removal of most of the natural-gasoline content, is first dehydrated as it is received from Panhandle Eastern's compressor station. It is then cooled to a temperature of —20° F. for high-pressure absorption in two towers. The lean gas comprising methane and 60 per cent of the original ethane is returned to Panhandle's compressor station for delivery to fuel customers on up the line.

A stream of 700,000 gal. per day of liquid hydrocarbons is transferred under pressure to Petro's fractionation unit which splits the stream into ethane, propane, and smaller volumes of isobutane, normal butane, and natural gasoline. Propane and butanes are presently marketed as L.P.G., while the relatively small natural-gasoline fraction is shipped to refiners in the area for blending to motor fuel.

Unique underground storage . . . The bulk of the propane will be stored underground in a 6,300,000-gal. cavern cut from an 18-ft. limestone stratum found 330 ft. beneath the Tuscola site. A 12-ft. shaft was sunk to the limestone bed, and a 400-ft. tunnel was cut horizontally in the stratum. Five parallel 450-ft. galleries join this tunnel at right angles.

Liquid propane is pumped into this

Here's What Petro Will Do With the 400,000 M.c.f. of Gas



system of tunnels through a concrete plug located at the base of the shaft. A rotary compressor handles withdrawals through a surface tank connected to the underground storage system. This storage system is believed to be the second largest of its kind in the world.

Ethane, currently the sole petrochemical building block at the Petro complex, is processed in the world's largest single ethylene unit. After purification, the gas is cracked in eight furnaces at short residence time and essentially atmospheric pressure.

Effluent gas, containing 20 to 30 per cent ethylene, passes a cooled quench spray which removes most of the tars, heavy polymers, and coke. Pentane and heavier fractions are removed by absorption, and acetylene present in the light fraction is converted to ethylene by mild catalytic hydrogenation. The wet gas is dried and stripped of methane and hydrogen by low-temperature absorption. Final fractionation at —32° F. separates an ethylene stream of 95 per cent minimum purity. Hydrogen is subjected to —275° F. for final purification.

Alcohol plant . . . Approximately 7,700,000 cu. ft. of ethylene per day is converted to 190-proof ethyl alcohol and ethyl ether by the sulfuric acid process. The unit's production capacity of 125,000 gal. per day represents 25 per cent of all synthetic alcohol produced in the United States before the Petro plant went on stream.

Sulfuric acid for alcohol synthesis is manufactured in an adjacent $2,000,000 plant by National Distillers' U.S.I. Chemicals Division. The unit is capable of producing 140,000 tons per year of 98 per cent sulfuric acid. Spent acid from the alcohol unit is partly reconcentrated and then returned to U.S.I. for sale, primarily for use in fertilizer manufacture.

Ethyl chloride . . . The ethylene plant supplies daily approximately 1,000,000 cu. ft. of ethylene and a 500,000 cu. ft. of hydrogen to the ethyl chloride plant. Hydrogen is combined with about a tank car a day of chlorine to form hydrogen chloride which is in turn combined with ethylene to produce high-purity ethyl chloride. Tank-car shipments of this product will go to the manufacture of tetraethyl lead and other end products requiring high purity ethyl chloride.

Ammonia . . . At present a small portion of the hydrogen from the ethylene unit is purified for ethyl chloride manufacture and the remainder is used for plant fuel. About 1 year hence, the balance of the hydrogen will be purified for synthesis in a $7,000,000 ammonia plant, now under construction by U.S.I. Use of byproduct hydrogen will net substantial savings in both capital and production costs of ammonia manufacture at Tuscola. The 50,000-ton yearly output of this plant will go partly into nitric acid, ammonium nitrate, and nitrogen solutions.

The combined availability of these nitrogen compounds, together with sulfuric acid from U.S.I.'s other local plant, provide an excellent source of fertilizer basics in the heart of a great agricultural region. It is expected that Tuscola will become a center for fertilizer manufacture.

Polyethylene prospects . . . Still another petrochemical project is in the making at Tuscola. Petro plans to commence operations of a 25,000,000-lb. polyethylene plant by the second quarter of 1955. This original capacity will be doubled within the following 2 or 3 years. A large fraction of this proposed polyethylene production has already been contracted for, according to Petro.

Where Petro will go from there is not yet determined, but it is likely that research programs under way by National Distillers will contribute further to chemical diversification at Tuscola.

A number of contractors participated in building the Tuscola plant. J. F. Pritchard & Co. of Kansas City played a major role, designing and constructing the extraction, fractionation, hydrocarbon storage, power, sewage, and water-treating units and building the alcohol unit and acid-recovery plant. The ethylene unit was designed and built by Lummus Co. of New York.

Foster Wheeler Corp., New York, designed and built the ethyl chloride plant. Design of the alcohol unit was done by Vulcan Copper & Supply Co., Cincinnati, and National Lead Co., New York, designed the acid-recovery plant.

The new ammonia and polyethylene plants were designed by M. W. Kellogg Co., New York, which also has the construction contracts. Hydrogen-purification and air-separation facilities for the new ammonia plant will be designed and built by L'Air Liquide Society, Montreal. The underground propane storage was constructed by Maclean Grove & Co., Inc., New York.

Pipe-Line Records Fall in '53

- Construction of crude and products lines will total 8,700 miles this year
- Outlook for '54 is for a further increase in product lines, fewer crude lines

APPROXIMATELY 8,700 miles of pipe lines with an aggregate capacity of 2,500,000 bbl. daily of crude oil and 1,000,000 bbl. of products will be completed this year at a cost in excess of $480,000,000.

This estimate, made by the Petroleum Administration for Defense, means an increase of more than 50 per cent over last year's 5,572 miles built at a cost of about $275,000,000.

PAD pointed out, however, that the 1953 figures are swollen and the 1952 figures reduced by the fact that some lines scheduled for completion last year were not put into operation until this year.

The PAD figures were compiled by John Boice, chief of the pipe line, engineering, and materials branch of the supply and transportation division. They are based on project approvals under the Controlled Materials Plan up to last June 30 and tax amortization certificates issued since then.

Outlook for 1954 . . . Present indications are that there will be a drop in crude line but an increase in products-line construction next year as compared with 1953.

So far, only 1,158 miles of crude and 4,172 miles of products lines have been scheduled for completion next year at a cost of $350,000,000, but additional lines not yet announced are expected to be built.

In adidtion to the major systems for which statistics were compiled, Boice estimates that about 1,000 miles of gathering lines will be laid this year, compared with 1,300 miles in 1952.

A number of large projects contributed to make the 1953 construction outstanding, Boice pointed out.

In crude lines, the list was topped by the $76,147,000 Lakehead Pipe Line Co.'s 643 miles, 30-in. line, the largest-diameter crude line in this

Principal Crude Pipe Lines Scheduled for 1954 Completion

Owner and location—	Miles	Diameter (in.)	Capacity (bbl. per day)	Estimated cost
Cities Service Pipe Line Co.:				
Houston to Sour Lake, Tex.	60	12	60,000	$2,654,000
Sinclair Pipe Line Co.:				
Pauls Valley to Bradshaw Gate plant, Okla. (loop)	10	12	24,000	817,000
Transmountain Oil Pipeline Co.:				
Sumas to Ferndale, Wash.	26	16-24	35,000	2,750,000
Proven Oil & Refining Co.:				
Connection with West Coast Pipeline to Florence, Ariz.	32	8	15,000	767,000
West Coast Pipeline Co.:				
Midland, Tex., to Norwalk, Calif.	1,030	20-24-26	300,000	111,534,000
Total	1,158			$118,522,000

Principal Products Pipe Lines Scheduled for 1954 Completion

Owner and location—	Miles	Diameter (in.)	Capacity (bbl. per day)	Estimated cost
American Pipe Line Corp.:				
Beaumont, Tex., to Newark, N. J., with branches	1,910	8 to 26	300,000	$145,337,000
Badger Pipe Line System:				
East Chicago, Ind., to Madison, Wis.	215	8-10-12	65,000	15,000,000
International Pipeline, Inc.:				
Wrenshall to Minneapolis, Minn.	132	8	25,000	4,350,000
Shamrock Oil & Gas Corp.:				
McKee to Amarillo, Tex.	55	6	18,000	1,151,000
Triangle Pipe Line Co.:				
Arkansas City, Ark., to Covington, Ky.	560	12	75,000	24,541,000
Williston Basin Pipe Line, Inc.:				
Laurel to Glendive, Mont.	248	6-8	21,000	5,181,000
Oklahoma-Mississippi River Products Line, Inc.:				
Duncan, Okla., to West Memphis, Ark.	475	10-12	46,000	16,786,000
Salt Lake Pipe Line Co.:				
Adams, Ore., to Pasco, Wash. (loop)	40	6	7,000	1,790,000
Yellowstone Pipe Line Co.:				
Billings, Mont., to Spokane, Wash.	537	10	30,000	20,500,000
Total	4,172			$234,636,000

Principal Crude Pipe Lines Scheduled for 1953 Completion

Owner and location—	Miles	Diameter (in.)	Capacity (bbl. per day)	Estimated cost
*Sterling Pipe Line System:				
Merino, Colo., to Gurley, Neb.	118	10-12	42,000	$2,201,000
*Cities Service Pipe Line Co.:				
Sour Lake, Tex., to Lake Charles, La.	64	20	200,000	3,733,000
*Cooperative Refining Association:				
Holdredge, Neb., to Phillipsburg, Kans.	48	6	5,000	762,000
*Humble Pipe Line Co.:				
Hawkins, Tex., to Tex.-La. line, near Shreveport, La.	71	16-18	77,000	2,758,000
*Interstate Oil Pipe Line Co.:				
Shreveport to Baton Rouge, La.	222	8 to 22	133,000	11,487,000
*Phillips Pipe Line Co.:				
Missouri City to Sweeney, Tex.	45	12	35,000	1,851,000
Odessa to Borger, Tex. (loop)	47	14	21,200	1,061,000
*Platte Pipe Line Co.:				
Byron-Garland and Oregon Basin to Chatham, Wyo.	97	12-14	23,650	3,027,000
*Socony-Vacuum Oil Co., Inc.:				
Chase to Valley Center, Kans. (loop)	16	10	15,000	587,000
South Cole Creek to Casper, Wyo.	14	6		185,000
*Gulf Refining Co.:				
Portilla field to Corpus Christi, Tex.	22	8	12,000	613,000
Goldsmith to Midland, Tex. (loop)	37	10	12,750	880,000
*Interstate Oil Pipe Line Co.:				
South Louisiana to Baton Rouge	162	4 to 16	80,000	6,200,000

(Continued on next page)

country, from Superior, Wis., to Sarnia, Ont.

There were also the $52,000,000 666 mile, 22 and 24-in. line from Drumright, Okla., to East Chicago, Ind., built by Sinclair Pipe Line Co.; the $39,672,000 580 mile 20 and 26-in. line built by West Texas Gulf Pipe Line Co. from Colorado City to Lucas and Longview, Tex.; and the $35,000,000 457 mile 24-in. line built by Rancho Pipe Line System from McCamey to Houston, Tex. The four lines have an aggregate capacity of 890,000 bbl. daily.

In products lines, the outstanding projects were the $24,000,000 356 mile 8 to 16-in. line built by Buckeye Pipe Line Co. from Linden, N. J., to New York state points; the $15,450,000 300 mile 16-in. line of Wolverine Pipe Line Co. from East Chicago, Ind., to Detroit and Toledo, the $12,900,000 191 mile 16-in. line of the Evangeline Pipe Line System from Port Arthur, Tex., to Baton Rouge, La.; the $11,545,000 243 mile 10 and 12-in. line of Standard Oil Co. (Ind.) between Whiting, Ind., and River Rouge, Mich.; and the $10,210,000 304 mile 12-in. line built by the same company from Sugar Creek, Mo., to Dubuque, Iowa. The five lines will have an aggregate capacity of 395,000 bbl. daily.

Two large lines are among the 14 already announced for completion next year. They are the 1,030-mile 20 to 26-in. $111,534,000 crude line to be built by West Coast Pipeline Co. between Midland, Tex., and Norwalk, Calif., with an initial capacity of 300,000 bbl. daily; and the $145,337,000 1,910-mile 8 to 26-in. products line from Beaumont, Tex., to Newark, N. J., announced by American Pipe Line Corp. recently, with a 300,000-bbl. daily capacity.

Details of the 1953 and 1954 construction are shown in the accompanying tables.

Owner and location—	Miles	Diameter (in.)	Capacity (bbl. per day)	Estimated cost
*Lakehead Pipe Line Co.:				
Superior, Wis., to Sarnia, Ont., Canada	643	30	100,000	76,147,000
*Sinclair Pipe Line Co.:				
Panova to Cushing, Okla.	45	18	78,000	2,062,000
*Service Pipe Line Co.:				
Bowie, Tex., to Drumright, Okla.	163	16	42,000	7,098,000
*Pan American Pipe Line Co.:				
Genoa to Texas City, Tex.	27	26	200,000	2,150,000
Arden Junction to El Dorado, Tex.	43	16	48,000	2,275,000
*Pasotex Pipe Line Co.:				
Wink to El Paso, Tex. (loop)	200	8	16,000	3,283,000
*West Texas Gulf Pipe Line Co.:				
Colorado City to Lucas and Longview, Tex.	580	20-26	300,000	39,672,000
*Rancho Pipe Line System:				
McCamey to Houston, Tex.	457	24	210,000	35,000,000
*Sinclair Pipe Line Co.:				
Drumright, Okla., to East Chicago, Ind.	666	22-24	280,000	52,000,000
*General Petroleum Corp.:				
San Ardo to Estero Bay, Calif. (loop)	11	10	5,000	587,000
*Magnolia Pipe Line Co.:				
Nolley and Magutex fields, Andrews County, Texas	47	4-6-8	10,000	550,000
*Buckeye Pipe Line Co.:				
Hasel Jct., Ohio, to Earhart, Mich. (loop)	11	8-12	10,000	620,000
*Pure Transportation Co.:				
Kimball to Gurley, Neb.	43	8	25,000	902,000
Continental Pipe Line Co.:				
Sussex to Glenrock, Wyo.	58	8	9,000	1,153,000
Gulf Refining Co.:				
Tambalier and Bay Marchand to Ostrica, La.	56	10-12	50,000	3,195,000
West Bay field to Ostrica, La.	33	8-10	40,000	1,679,000
Lea County, New Mexico	63	8-15		
Magnolia Pipe Line Co.:				
Ringgold to Corsicana, Tex.	155	16	70,600	5,740,000
Texas Pipe Line Co.:				
Southern Louisiana	47	4-8-10	22,000	1,638,000
Goodall Pipe Line Co.:				
Badger Creek to Merino, Colo.	45	8	23,000	872,000
Service Pipe Line Co.:				
Williston Basin to Mandan, N. D.	170	12-16	35,000	6,675,000
Texas-New Mexico Pipe Line Co.:				
Midland to Dawson County, Texas	52	10		
Texas Pipe Line Co.:				
Golden Meadow to Houma, La.	66	4 to 12		
Paradis to Golden Meadow, La.	40	14		
Atlantic Pipe Line Co.:				
Wood to Andrews, Tex.	31	8	29,000	556,000
Kaybee Pipe Line Co.:				
Griffith, Ind., to Buffalo, Mich.	46	10	12,000	945,000
Michi, Inc.:				
Highland, Ind., to Elsie, Mich.	222	10	20,000	6,413,000
Pasotex Pipe Line Co.:				
Snyder to Wink, Tex.	154	10	23,000	4,443,000
Total	5,168			$291,556,000

*Already completed.

Principal Products Pipe Lines Scheduled for 1953 Completion

Owner and location—	Miles	Diameter (in.)	Capacity (bbl. per day)	Estimated cost
*Evangeline Pipe Line System:				
Port Arthur, Tex., to Baton Rouge, La.	191	16	96,000	$12,900,000
*Indiana Farm Bureau Cooperative Association:				
Mount Vernon to Peru, Ind.	230	4-8	12,000	5,208,000
*Sinclair Pipe Line Co.:				
Houston to Port Arthur, Tex.	83	12	54,000	3,085,000
*Texas Co.:				
Sour Lake to Beaumont, Tex. (butane)	34	6	10,000	604,000
*Buckeye Pipe Line Co.:				
Linden, N. J., to Allentown, Syracuse, and Caledonia, N. Y.	356	8 to 16	115,000	24,000,000
*Phillips Pipe Line Co.:				
Between Borger, Tex., and Paola, Kans.	63	12	15,000	1,985,000
Paola, Kans., to East St. Louis, Ill. (loop)	44	10	5,500	1,284,000
*Plantation Pipe Line Co.:				
Charlotte to Greensboro, N. C. (loop)	82	14	53,500	7,974,000
*Salt Lake Pipe Line Co.:				
Pasco to Spokane, Wash.	140	8	12,000	4,500,000
*Standard Oil Co. (Ind.):				
Mandan, N. D., to Moorhead, Minn.	207	10	40,000	8,274,000
Sugar Creek, Mo., to Dubuque, Iowa	304	12	40,000	10,210,000

(Continued on next page)

Deep Rock Buys Gas Company

TULSA.—Deep Rock Oil Corp. has acquired all the capital stock of Hugoton Plains Gas & Oil Co. for $1,150,000 in cash and 20,000 shares of Deep Rock common stock.

W. H. Garbade, Deep Rock president, said the newly acquired company will function as an independent Deep Rock subsidiary. Hugoton Plains operates 178 producing gas wells in western Oklahoma and Kansas and has a products extraction plant at Tyrone, Okla.

Garbade said last week the purchase of Hugoton Plains, plus shut-in gas reserves in the Many Islands field of Alberta, strengthens Deep Rock's position in the gas industry.

Owner and location—	Miles	Diameter (in.)	Capacity (bbl. per day)	Estimated cost
*Sun Pipe Line Co.:				
Toledo, Ohio, to Inkster Junction, Mich.	50	8	20,000	1,315,000
*Phillips Petroleum Co.:				
Spraberry to Plymouth-Benedum plant, West Texas	36	6-8	5,000	1,015,000
*Tuscarora Oil Co., Ltd.:				
Allentown to Tuckerton, Pa.	27	12	45,000	1,154,000
Harbor Products System:				
Philadelphia, Pa., to Trembley, N. J.	124	8-12-14-16	110,000	8,911,000
Bell Oil & Gas Co.:				
Ardmore to Cushing, Okla.	145	6-8	9,000	3,271,000
Cal-Ore Pipeline Co.:				
Crescent City, Calif., to Medford, Ore.	103	6	8,000	2,272,000
El Paso Natural Gas Co.:				
Bloomington to Gallup, N. M.	123	3-6	6,000	1,333,000
Goliad Corp.:				
Kittie plant to Corpus Christi, Tex.	117	4-6	9,000	2,252,000
Kaneb Pipe Line Co.:				
Augusta, Kans., to Fairmont, Neb.	248	8-10	25,000	8,600,000
Standard Oil Co. (Ind.):				
Whiting, Ind., to River Rouge, Mich.	243	10-12	49,000	11,545,000
Wolverine Pipe Line Co.:				
East Chicago, Ind., to Detroit, Mich., and Toledo, Ohio	300	16	95,000	15,450,000
Augusta Pipe Line Co.:				
Arkansas City to Augusta, Kans.	43	8	35,000	1,200,000
Miami Valley Corp.:				
Cheviot to Sedansville, Ohio	12	8		180,000
Great Lakes Pipe Line Co.:				
Nebraska City to Grand Island, Neb.	130	8		
Inland Corp.:				
Springfield to Dayton, Ohio	22	8	26,000	538,000
Texas Pipe Line Co.:				
Fuller Ranch to Colorado City, Tex.	32	4		440,000
East Chicago, Ind.	6	16	96,000	415,000
Total	3,500			$189,802,000

*Already completed.

Carthage Deal Open

Stanolind given option on Brownsville synthesis plant

TULSA.—The way was cleared last week for Stanolind Oil & Gas Co. to take over the Carthage Hydrocol, Inc., gas-synthesis plant at Brownsville, Tex.

E. F. Bullard, Stanolind president, announced that Stanolind had signed an agreement with Reconstruction Finance Corp. giving Stanolind, in effect, an option on the $50,000,000 plant.

Bullard said the arrangement provides that Stanolind may make "whatever examinations and investigations it deems necessary" and, if it still wishes to take over the plant, may acquire the stock and assume the "obligations of Carthage Hydrocol, Inc."

The obligation is a first mortgage on the plant held by RFC of $18,500,000, about $1,000,000 of which has been repaid. It has been estimated that an additional $18,000,000 investment would be necessary to raise production to the plant's rated capacity.

Owners withdraw . . . Acquisition of the huge synthesis plant by Stanolind was made possible by decision of the nine stock-owning companies to write off their investment as a total loss.

First to call it quits was United Gas Corp., which was joined shortly by The Texas Co., Chicago Corp., Hydrocarbon Research, Inc., La Gloria Corp., Niagara Share Corp., and Western Natural Gas Co. Two early holdouts, Stone & Webster and Forest Oil Corp., agreed to the plan early in November (*The Oil and Gas Journal, November 9, page 66*).

The Brownsville plant was designed to process 90,000,000 cu. ft. of gas daily to produce about 7,000 bbl. of petroleum products and a large quantity of byproduct chemicals. From its initial operation, the plant was plagued with process difficulties and never reached a rate of operation greater than a third of its rated capacity.

Stanolind's interest in the plant lies in its ownership of a $15,000,000 chemicals plant adjacent to the Carthage processing center. Stanolind built its plant to process a byproduct chemical stream from Carthage, and this plant would represent a potential huge loss to Stanolind in the event the Carthage plant were abandoned.

Reno Oil Price Revealed

HOUSTON.—Tennessee Production Co. will pay $12,789,250 for the oil and gas properties of the defunct Reno Oil Co.

Purchase of the properties by Tennessee from Mid-Way Co. and Northwood Oil Co. was announced last month (*The Oil and Gas Journal, November 2, page 61*), but it was not until Tennessee Production's third quarterly report last week that the consideration was revealed.

Tennessee will pay $6,789,250 in cash and the $6,000,000 balance from future production of the properties in Texas, Oklahoma, New Mexico, West Virginia, Ohio, Kentucky and Pennsylvania.

World's Largest Orthoflow Under Way

A major portion of the expansion work under way at Atlantic Refining Co.'s 123,500-bbl. refinery in Philadelphia is the Orthoflow Fluid catalytic cracking unit being erected by M. W. Kellogg Co. Upon completion, the new unit will be the largest of its type in the world with a throughput of 45,000 bbl. per day.

Small Refiners Growing

They're taking a bigger share of total U. S. capacity; PAD sees topping capacity of 8 million barrels by '56

WASHINGTON.—The nation's crude topping capacity may reach 8,404,000 bbl. daily by the end of 1955 with the country's smaller refiners taking an increasingly important part in the overall refining picture.

The nation will reach that 8 million-plus capacity if rapid tax writeoff certificates already issued are actually followed through with construction.

Petroleum Administration for Defense estimates catalytic cracking capacity will be increased from 1,978,000 in 1950 to 2,992,000 bbl. daily by the end of 1955. Catalytic reforming capacity, PAD says, will increase from 79,000 bbl. daily in 1950 to 528,000 bbl. in 1955.

A significant feature of PAD's figures is the increase in the relative importance of the smaller refiners. The smallest refiners, processing less than 20,000 bbl. daily of crude, will increase their share of the total capacity from 9.81 to 10.97 per cent in crude topping facilities, 1.88 to 6.86 per cent in catalytic cracking and 1.90 to 9.25 per cent in catalytic reforming.

Certificates issued to these companies cover 16 per cent of the additional crude topping capacity, 16.7 per cent of the additional catalytic cracking capacity and 8.3 per cent of the additional catalytic reforming capacity.

These figures confirm a general trend noted more than 18 months ago *(The Oil and Gas Journal, May 31, 1951, page 58).*

The intermediate refiners, processing between 20,000 and 50,000 bbl. daily of crude, would increase their share from 8.97 to 9.83 per cent in topping capacity, 6.77 to 7.90 per cent in catalytic cracking and nothing to 13.28 per cent in catalytic reforming. Their certificates cover 13.6 per cent of the proposed new topping capacity, 10.1 per cent of catalytic cracking capacity and 14.5 per cent of catalytic reforming capacity.

As a result of these shifts the percentage of capacity in the hands of the group of largest refiners will drop from 81.22 to 79.20 in crude topping, 91.41 to 85.24 in catalytic cracking and 98.10 to 77.47 in catalytic reforming, it was pointed out.

Of considerable significance, Deputy Petroleum Administer Joseph A. LaFortune pointed out, is the adoption by the small refiners of modern and more efficient processes as shown by the indicated increase in catalytic cracking capacity from 36,000 to 205,000 bbl. daily and in catalytic reforming capacity from 1,500 to 49,000 bbl. a day.

Details of PAD's analysis are shown in the accompanying table.

CRUDE-OIL TOPPING

	January 1, 1951		Add. capacity recommended	January 1, 1956	
	Capacity (bbl. per day)	Per cent of national capacity	for T.A. certificates (bbl. per day)	Estimated§ capacity (bbl. per day)	Per cent of national capacity
Large companies*	5,544,550	81.22	1,111,709	6,656,259	79.20
Intermediate companies†	612,300	8.97	214,050	826,350	9.83
Small companies‡	669,484	9.81	252,151	921,635	10.97
Total capacity	6,826,334	100.00	1,577,910	8,404,244	100.00

CATALYTIC CRACKING

Large companies	1,808,430	91.41	742,535	2,550,965	85.24
Intermediate companies	134,000	6.77	102,273	236,273	7.90
Small companies	36,000	1.82	169,325	205,325	6.86
Total capacity	1,978,430	100.00	1,014,133	2,992,563	100.00

CATALYTIC REFORMING

Large companies	77,685	98.10	331,551	409,236	77.47
Intermediate companies			62,647	70,147	13.28
Small companies	1,500	1.90	35,760	48,860	9.25
Total capacity	79,185	100.00	429,958	528,243	100.00

*Refining 50,000 bbl. per day or more crude on January 1, 1951. †Refining 20,000-49,999 bbl. per day crude on January 1, 1951. ‡Refining less than 20,000 bbl. per day crude on January 1, 1951. §Assumes completion of all projects for which tax amortization certificates have been granted.

Seismic Research

3 years of field work by special crew is described

DALLAS.—Highly satisfactory results are being obtained from a seismograph field-research unit, H. M. Thralls, vice president of Seismograph Service Corp., Tulsa, told the seventh midwestern meeting of the Society of Exploration Geophysicists here last week.

The research crew has been in operation since 1950 and has worked continuously on field research, completing an average of one project assignment a month, Thralls said. Coauthor of Thralls' paper was J. W. Hammond, also of S.S.C.

Success of the research project is largely due to the fact that it was completely divorced from the commercial crews, Thralls said.

Most geophysical departments have felt the need of a research crew, he said, and their experiences probably are similar: After one or two projects, a rush commercial job appears for which no crew is available, and that is the end of the research unit.

When the Seismograph Service crew was set up, two basic requirements were the designing of equipment specifically for research purposes and the staffing of the crew with the experts usually assigned to problem areas. In its operations, crew members were encouraged to get out of their habit of saving money by short cuts in operations, on the theory that short cuts would be harmful to an experimental approach.

In the beginning, Thralls said, the research unit considered only those areas of poor or unusable record quality as worthy of a project. Since then it has been shown that most areas present problems other than general record quality which can be solved or partially solved by a combination of laboratory and field research. Results here, Thralls said, can contribute as much toward improving seismic interpretation as can general record quality improvement in areas of normally poor record quality.

Industry Briefs

OIL CITY, Pa.—The Pennsylvania Grade Crude Oil Association here has been awarded the American Trade Association Executives' Certificate of Merit for the work the 30-year-old oil group has done on behalf of its industry. In part, the citation commends the non-profit organization of producers, refiners, and marketers for taking "a

leading role in the industry's creation of specialized lubricating oils and other products."

EDMONTON, Alta. — Stockholders of three Edmonton independents will meet next week to vote on a proposed merger of the three firms into a new company to be known as Mic Mac Consolidated, Ltd. The three companies are Banner Petroleum Corp., Mic Mac Oil, Ltd., and Skyline Oils, Ltd.

DALLAS. — General American Oil Co. recently paid $1,500,000 for 30 producing wells in and west of Kilgore, Tex., owned by John Wrather, Dallas operator. The transaction is the largest involving East Texas properties for 1953.

Exploration Challenge

Today's assignments are tougher, Lay tells S.E.G.; new objective is finding the thousands of little structures

Carl Hoot

DALLAS.—Exploration assignments for geophysicists now are more challenging than they ever have been.

The emphasis today is on small structures requiring more accurate and deeper geophysical interpretations, and the work is largely in areas formerly considered too difficult for such studies, Roy Lay, president of the Society of Exploration Geophysicists, told the seventh annual midwestern meeting of the society here last week.

Thousands of smaller structures are now the objective of geophysical exploration thinking, Lay said, in contrast to the dozens of larger structures that were their original target.

Where in the past, features were turned down as nonprospective because only 100 ft. of closure was shown, industry is now mapping and drilling structures with only 25 ft. of closure, and even noses or terraces with no evidence of closure. Maps, Lay said, are no longer made only on outstanding reflections, but on reflections so weak and poor they appear insignificant.

Similarity helps . . . Seismic exploration has been made more effective by recognition of the basic truism that few areas are unique, Lay said.

While there are problem areas which require more than a standard geophysical approach, many widely separated areas with similar geological conditions show similar geophysical results. One example is the sedimentary basins of California and those of the Gulf Coast province.

These regions have many similarities, although they differ in that Gulf Coast structures generally are associated with salt uplift or result from tensional forces, whereas structures in California basins usually are related to basement uplifts or result from compressional forces. Thick Tertiary sedimentary sections are present in both areas, and these sediments are characterized by numerous and erratic facies or lithologic changes, and few extensive marker-beds, with the result that reflection response is quite variable. Individual seismic records may be good, but very few reflections are persistent and it is usually necessary to resort to phantom-horizon interpretation, Lay continued.

Other examples included a buried basement uplift in California, and another across piercement-type salt dome in Louisiana. In both instances, absence of reflections within the basement and salt masses was very noticeable and was sufficiently definite in the case of the salt dome to outline the flanks of the structure. Both areas showed good reflection response, but absence of extensive correlations was noticeable. Profile of salt mass as indicated by reflection work was substantiated by well-control while the configuration of the basement high was obtained from refraction shooting.

Gravimetrically, dense igneous rocks of basement highs in California and less-than-average density of salt domes in the Gulf Coast provide measurable contrasts with the relatively minor density differences within the Tertiary sediments, Lay said. Structural highs are therefore quite often associated with gravity maxima in California and with gravity minima in the Gulf Coast.

Deeper study inevitable . . . Lay said it was inevitable that study of geophysical results would lead to question of geologic cause and would awaken interest among geophysicists in fundamental geologic problems.

Geophysics gives measurements of the thickness of sediments in deep basins, and often changes or strengthens existing ideas regarding extent and magnitude of unconformities, the presence of intrusives, and the position and age of faulting.

As a result, he said, geophysicists are making substantial contributions to basic geological thinking and to the solution of many specific problems.

Reference was made to one prolific reef area, where the only reef-evidence obtained by the seismograph was a weak, obscure reflection, which usually showed radically different dip from that of immediately adjacent prominent reflections.

In the late thirties a geophysicist pointed out that Pennsylvanian coral reefs in North Central Texas would cause false structure to be mapped on deeper beds because of velocity differences, and that dry holes might be drilled as a result. But during the past several years the geophysicists have been busy searching for the very reefs which once were regarded as a hazard to seismic exploration.

New Mexico's South Lovington Field Crowded

Three pay zones in New Mexico's South Lovington field, Lea County, have helped make the county a busy one in the past 2 years. These three Amerada Petroleum Corp. wells are typical of the field's development. Amerada has 12 wells like these on one quarter section and is drilling a similar pattern on an adjoining quarter. The flowing well in the foreground produces from the Abo at 8,450 ft. and was completed in May 1952. The center well, completed in 1939, produces from the San Andres, the field's first pay. The second pumping well, completed in August, produces from the Paddock at 6,250 ft.

TEXANS HOPE to see scenes like this some day in the 10½-mile strip paralleling their coast. These Shell Oil Co. facilities lie off Louisiana; Texas as yet has no production within its 3-league offshore boundary.

Gulf Leases on Block

Texas schedules December 1 lease sale including more than 450,000 offshore acres in Gulf of Mexico waters

AUSTIN.—Sealed bids will be opened in the General Land Office here December 1 in one of the largest lease sales ever held by Texas involving offshore leases in the Gulf of Mexico.

This will be the second sale since the tidelands controversy was settled. The first was held September 1, when Stanolind Oil & Gas Co., Houston, was successful bidder on the four tracts offered, all of them off Jefferson County.

Bascom Giles, commissioner of the General Land Office, has already predicted that the December sale should bring in more money than any other ever held.

In addition to the offshore leases, hundreds of thousands of acres of state lands in other areas, and in bays and inlets, will be leased.

Offshore tracts . . . Offshore leases in the Gulf of Mexico include 374 tracts in all, and total 450,587 acres in 10 counties: Aransas, Brazoria, Calhoun, Chambers, Galveston, Jefferson, Kenedy, Kleberg, Matagorda, and Nueces.

The largest offshore acreage is in Matagorda County, where 85 tracts totaling 92,936 acres are located.

Other acreage, by counties, includes: Aransas, 48 tracts of 57,144 acres; Brazoria, 7 tracts totaling 14,400 acres; Calhoun, 33 tracts making up 37,431 acres; Chambers, Galveston, and Jefferson counties, a group of 8 tracts totaling 21,028 acres; Galveston, 21 tracts of 41,833 acres; Jefferson, 31 tracts made up of 67,068 acres; Kenedy, 8 tracts totaling 5,247 acres; Kleberg, 70 tracts comprising 29,419 acres; and Nueces, 63 tracts totaling 84,063 acres.

No drilling yet . . . To date there has been no actual resumption of tidelands drilling off Texas.

Stanolind has not started drilling on the four tracts off Jefferson County acquired in the September 1 lease sale. The company is awaiting clarification of the Department of Interior's proposed rules and regulations governing production in the Government areas beyond the 10½-mile limit.

Texas is far behind Louisiana in development of offshore oil. There is no commercial production in the tidelands off Texas. There are 120 wells producing from tidelands areas off Louisiana, plus 25 gas wells. Louisiana's cumulative production from the tidelands areas totals 20,000,000 bbl. Daily average production is around 22,000 bbl.

Work Pushed on New Denton Pool Gasoline Plant

Compression, dehydration, and desulfurization facilities being built in conjunction with the construction of a new gasoline plant in Denton pool, Lea County, New Mexico, are scheduled for completion by the first of the year. Plant operator will be Atlantic Refining Co. Construction of the gasoline plant proper will be completed in February next year. Gas-processing capacity initially will be 20,000,000 cu. ft. daily, with the main process vessels designed to handle ultimately 25,000,000 cu. ft. Liquids production will run about 124,000 gal. in the winter, 154,000 gal. in the summer. Construction contract is held by Dresser Engineering Co.

Allowable Cut Again

65,000 bbl. daily cut set for production in December

AUSTIN.—For the fourth consecutive month the Texas Railroad Commission cut the state's crude-oil-production allowable.

The state will be permitted to produce 2,756,906 bbl. daily in December, compared with 2,822,760 bbl. daily produced on November 7. This is a cut of 65,854 bbl. daily over the November average accomplished by permitting 17 producing days for the 31-day month, compared with the 17 days in the 30-day month of November.

East Texas field was left on a 17-day schedule. Pickton field will produce 9 days, Pantex 16, Spraberry Trend 11, and Kelly-Snyder 15.

Olin Culberson, commissioner, said that as new wells are brought in during the month, a boost of around 17,000 bbl. daily in the allowable may be anticipated.

September's allowable was 119,691 bbl. daily under August, and October's allowable 86,223 under September. The November allowable was 140,531 bbl. daily under the October allowable.

ALLOWABLES BY DISTRICTS
(Barrels per calendar day)

	Nov. 7	Dec.	Decrease
Dist. 1	44,555	43,892	573
Dist. 2	143,932	139,732	4,200
Dist. 3	450,314	441,157	9,157
Dist. 4	254,143	248,208	5,935
Dist. 5	48,167	46,959	1,208
Dist. 6 (outside East Texas)	121,550	118,298	3,252
Dist. 6 (East Texas field)	241,215	233,949	7,266
Dist. 7-B	147,547	144,522	3,025
Dist. 7-C	176,370	171,651	4,719
Dist. 8	869,856	847,047	22,809
Dist. 9	226,487	222,865	3,622
Dist. 10	98,624	98,536	88
Total	2,822,760	2,756,906	65,854

West Texas Flood Sought

AUSTIN. — A proposal to unitize and water flood Merkel field in Taylor County, Texas, has been presented to the Texas Railroad Commission by operators Walsh and Watts.

E. C. Rach, Austin consultant for the applicants, told Examiner Fred Young that the proposal has been accepted by all royalty and working interests concerned with the field. He pointed out that the flood project will cover 100 productive acres with recovery of 100,000 bbl. of crude expected. Present production is 2.3 bbl. per day from each of the lease's 11 producing wells.

Plans call for two wells initially to be used to make the injections at depths of 2,700 ft. The injection rates will be 250 bbl. per well daily.

Standard Plans Water Flood

AUSTIN.—Standard Oil Co. of Texas is seeking Texas Railroad Commission permission to water flood its Lucy Adams lease in the North Ward Estes field, Ward County, Texas.

Commission examiners were told the flood would take place 2,600 ft. under 300 acres of the lease's 640 acres. Also, testimony revealed that five of the lease's 11 producing wells, each of which produce an average of 8 bbl. per day, will be used to make injections of 1,000 bbl. daily. Nine other injection wells will be drilled.

Big Recovery Project Planned

AUSTIN.—A water flood project, which may produce an expected 3.5 million barrels of crude, is planned in the Brown County, Texas, Regular field on the leases held by Brundred Enterprises.

In presenting plans for the project to the Texas Railroad Commission, L. L. Brundred, Jr., stated that the 1,250-ft. Cross Cut reservoir underlying the Brundred leases would be flooded covering a 2,000-acre area. Water for the proposed flood would be obtained from Ellenburger lime at depths of 3,200 to 3,900 ft.

Average production from the wells on the leases presently stands at less than 2 bbl. each per day.

Seven Crossings With One Pull

HOUSTON.—Pipe-line crossing of navigable streams took on a new art here last week when Panama-Williams Co. pulled seven products lines simultaneously across the busy Houston Ship Channel.

The $1,000,000 operation was the first such project in pipe-line history.

The seven lines—three 12-in. and four 8-in.—were spaced and then securely yoked together by cross beams. The actual pulling operation was accomplished with a winch on one side of the channel and tractors on the other. The 2,500-ft. crossing was made in three sections, two of 900 ft. and a third of 700 ft.

Pipe was coated with concrete to provide extra weight and aid in holding it in the 5-ft. trench on the bottom of the 45-ft. channel.

The job was supervised by Shell Pipe Line Co. engineers. Shell is the operator of the Bayou Pipe Line Co., which owns two of the lines. The others are owned by Houston Pipe Line Co., Warren Petroleum Corp. and Texas Natural Gasoline Co.

The new lines will replace six old ones.

25 Plants for Sale

Government to begin accepting bids on synthetic-rubber facilities this week; lengthy, complicated procedure set

WASHINGTON.—The Government's synthetic-rubber industry was put up for sale this week.

The Rubber Producing Facilities Disposal Commission, entrusted by Congress with the disposition of the rubber facilities, announced it would receive bids between November 25 and next May 27.

Offered for sale were 13 plants for the manufacture of GR-S rubber, 2 for the manufacture of butyl rubber, 1 for the production of styrene, 8 for the production of butadiene, 1 for the manufacture of dodecyl mercaptan, a fleet of 448 pressure tank cars, and various miscellaneous items of equipment.

In addition the commission offered for either sale or lease the two plants for the manufacture of butadiene from alcohol at Louisville, Ky., and Kobuta, Pa.

Disposal of the plants operated by the Reconstruction Finance Corp., now in process of liquidation, is in the hands of the commission, composed of Everett R. Cook, president of Cook & Co., Inc., Memphis, Tenn.; Leslie R. Rounds, retired first vice president of the Federal Reserve Bank of New York, and Holman D. Pettibone, chairman of the board of Chicago Title & Trust Co.

Government aims . . . The commission announced that the disposal program "will be conducted with due regard to the several purposes of the disposal act, so that disposal of the synthetic-rubber producing facilities will establish a free, competitive synthetic-rubber industry, afford small business enterprises and other users the opportunity to obtain a fair share of the end products of the facilities sold and at fair prices, be consistent with national security, and realize full fair value for the facility or facilities, taking into consideration the policy enunciated by the Congress in the statute."

Following the receipt of proposals and further negotiations with bidders, the commission is required to secure the opinion of the attorney general as to whether contemplated sales are in accord with the antitrust laws and then present a complete disposal program to Congress for approval.

What is involved . . . The plants offered for sale have an aggregate capacity of 860,000 long tons of GR-S and 90,000 long tons of butyl rubber, 539,000 short tons of butadiene and 57,000 short tons of styrene.

The two alcohol-butadiene plants have a total capacity of 215,000 short tons. They will be sold on the basis of not less than 25 per cent of the purchase price in cash and a first mortgage for not longer than 10 years for the remainder with interest at the rate of 4 per cent.

Imports Set Record

729,200 bbl. daily average recorded in September

CRUDE imports reached a new all-time high in September with a total of 21,876,000 bbl. for the month or an average of 729,200 bbl. daily, according to data released by the Census Bureau of the Department of Commerce.

The previous record was for June of this year when receipts of foreign crude averaged 718,600 bbl. daily.

Compared with the record set in June, total crude imports in September were up 1.5 per cent. Receipts from producing countries of the Western Hemisphere were up 14.2 per cent in contrast with a decrease of 13.0 per cent in crude from the Eastern Hemisphere.

However, a comparison with totals for September 1952 shows a larger portion of the total gain credited to the Eastern Hemisphere. Crude from the Western Hemisphere gained only 8 per cent over September last year compared with a gain of 35 per cent for the Eastern Hemisphere.

Imports of crude on the West Coast averaged 112,000 bbl. daily, the highest level since last June when the average was 118,600 bbl. daily.

Residual imports for September averaged 294,800 bbl. daily, up 56,300 bbl. daily from August. Imports of heavy fuel tend to decrease during the summer months and move back up in the fall and winter. The low point for this was reached in August. The average for December 1952 was 538,000 bbl. daily.

Imports of other products decreased 6,600 bbl. daily from August. The total for these miscellaneous products may vary slightly from that reported by the Bureau of Mines since the bureau uses data reported directly by importing companies.

Total exports, excluding shipments to territories, averaged 316,000 bbl. daily in September, up 16,000 bbl. daily from August but down 45,000 bbl. daily from September 1952. The largest change from last year was in distillate fuel.

IMPORTS INTO CONTINENTAL UNITED STATES
(Thousands of barrels)

	Sept. 1953	Aug. 1953	Sept. 1952
Crude—			
Mexico	173	378	527
Colombia	1,159	1,317	1,244
Venezuela	11,458	10,109	10,250
Kuwait	4,073	2,778	2,166
Saudi Arabia	3,034	3,142	3,873
Qatar		121	
Iraq	197		
Canada	327	313	123
Far East	1,455	967	449
Total crude	21,876	19,125	18,632
Daily average	729	617	621
Products—			
Residual fuel	8,845	7,394	8,682
Other products	754	983	491
Total products	9,599	8,377	9,173
Daily average	320	270	306
Total all oils	31,475	27,502	27,805
Daily average	1,049	887	927

EXPORTS*

	Sept. 1953	Aug. 1953	Sept. 1952
Crude	1,109	1,321	1,664
Gasoline	2,638	2,492	2,148
Kerosine	439	381	655
Distillate fuel	1,961	1,445	3,266
Residual fuel	1,658	1,727	1,192
Lube oils	934	1,134	1,081
Other products	742	802	810
Total all oils	9,481	9,302	10,816
Daily average	316	300	361

*Excludes shipments to territories.

Secondary Stocks Up

Major-product inventories show September increase

WASHINGTON.—Secondary inventories of major oil fuels increased 2,420,000 bbl. during September, totaling 54,889,000 bbl. at the close of the month, it was announced last week by the Department of Commerce.

The increase was slightly larger than in the same month last year, but the month-end total was 3,000,000 bbl. under the holdings of 57,900,000 bbl. on September 30, 1952.

Most of the increase in September was in distillate stocks in the hands of jobbers and in bulk terminals of refiner-marketers, which rose by 1,800,000

bbl., the monthly census report showed. Kerosine and fuel-oil inventories also increased, the former by 581,000 bbl. and the latter by 281,000 bbl. while gasoline holdings dropped 266,000 bbl.

Total stocks in PAD districts 1, 2, 3 and 4, where the Census Bureau estimated secondary storage capacity of 84,400,000 bbl. as of July 31, amounted to 51,200,000 bbl. on September 30.

Inventories held in the several districts September 30, compared with August 31, 1953 and September 30, 1952, are shown in the accompanying table, in thousands of barrels.

	Aug. 1953	Sept. 1953	Sept. 1952
GASOLINE:			
PAD 1	5,301	5,145	5,843
PAD 2	8,303	8,143	8,237
PAD 3	2,569	2,602	2,542
PAD 4	987	926	967
PAD 5	2,092	2,170	2,019
Total U. S.	19,252	18,986	19,608
KEROSINE (inc. Range Oil):			
PAD 1	3,140	3,451	3,547
PAD 2	3,070	3,258	3,718
PAD 3	575	654	606
PAD 4	87	90	99
PAD 5	100	100	107
Total U. S.	6,972	7,553	8,077
DISTILLATE:			
PAD 1	11,145	12,595	13,081
PAD 2	5,693	6,240	7,004
PAD 3	950	843	1,086
PAD 4	482	489	506
PAD 5	1,281	1,209	1,309
Total U. S.	19,551	21,376	22,986
RESIDUAL:			
PAD 1	4,609	4,789	4,725
PAD 2	1,527	1,571	1,952
PAD 3	465	415	453
PAD 4	6	8	8
PAD 5	86	191	91
Total U. S.	6,693	6,974	7,229
FOUR PRODUCTS:			
PAD 1	24,195	25,980	27,196
PAD 2	18,593	19,212	20,911
PAD 3	4,559	4,514	4,687
PAD 4	1,562	1,513	1,580
PAD 5	3,559	3,670	3,526
Total U. S.	52,468	54,889	57,900

Import Hearings Scheduled

WASHINGTON.—Hearings on the availability to the United States of fuels from the Western Hemisphere and the effects of high-level residual oil imports will open November 30 before a Senate Interior subcommittee headed by Sen. George W. Malone of Nevada.

Malone announced that spokesmen for the oil and other fuel industries will be called to testify on Western Hemisphere reserves, and the subcommittee will examine the fuel situation "so far as the availability and accessi-

WATCHING WASHINGTON

Bertram F. Linz

Chemists Eye Shale Work

The first major field for use of oil shale and coal synthetics will be in the production of chemicals rather than liquid fuels, Interior Department experts now believe.

The chemical industry is expected to get into large synthetic operations long before the establishment of a sizable synthetic liquid fuels industry.

Bureau of Mines' research and development now is being watched even more closely by chemical interests than by the oil industry, Felix E. Wormser, assistant secretary for mineral resources, indicated.

The first application of processes for synthesizing chemicals from coal was undertaken by the Carbide and Carbon Co. at South Charleston, W. Va. It is being closely followed by the industry, as are developments at the Bureau of Mines' oil shale project at Laramie, Wyo.

The high yield of low-boiling aromatics at Laramie, Wormser said, opens up new horizons for the chemical utilization of oil shale and "it is apparent that long before the establishment of a sizable synthetic liquid fuels industry based on oil shale and coal, the chemical industry will apply the results of synthetic liquid fuel research and development to the production of bulk organic chemicals."

Industry Watching Ives

Concern is being expressed in some industry circles over the naming of Sen. Irving M. Ives of New York as acting chairman of the Senate Labor subcommittee in charge of Taft-Hartley Act revision and in an amendment which he and Sen. Paul Douglas of Illinois introduced last April to establish the "National Production Council" plan.

Ives was an original director of the Industry Council Association, established in 1950 to promote the idea of a National Production Council to run all industry and trade, with satellite councils in every basic industry. His amendment to the Taft-Hartley Act would express the will that this should be initiated on a voluntary basis.

The councils would be composed of representatives of organized labor, farmers, consumers, management and the government, giving management but one vote in five in determining how it should run its business.

The councils would have impressive powers. They would determine production, investment and technological policies; wages and hours; labor-management relations; construction, operation and closing down of plants; farm prices, crops to be planted and acreages, and would also have control of all natural resources.

In other words, the councils could limit or expand production of oil and other products, natural and manufactured, as they saw fit, halt or encourage the development of technological improvements, determine the location and size of new plants and control the working conditions of labor—all in the guise of a "free economy."

How Big is Government?

Oil men complain they have to deal with too many federal agencies —some 37 of them at the last count —but few realize just how big government has become in the United States.

The federal Government is just part of the picture. Oil men, as individuals and as business men, have to deal with government right down to the local school district.

Just how big is the government organization — federal, state and local—is a matter of speculation. A conservative estimate places its cost at a cool $101 billion a year, or $646 per capita. Just how many people work in government has never been exactly determined, but there are more than 2,000,000 civilian employes in the federal service alone.

Here are a few basic figures: There are by actual count 116,743 major units in the federal Government, 48 states, 3,049 counties, 16,778 municipalities, 17,202 townships, 67,346 school districts and 12,319 special districts.

The number of agencies is many times the number of major units. The federal Government alone has 13 departments, 9 agencies, 19 commissions, 29 administrations, 22 corporations, 630 offices, 127 services, 107 bureaus, 627 divisions, 32 branches, 58 boards and 444 miscellaneous units, for a total of 2,117.

bility of oil, gas and coal is concerned, especially in time of war."

The subcommittee, he said, also plans to question witnesses as to how residual imports affect the production of domestic fuels.

5-Year Tanker Contract Let

WASHINGTON.—The Military Sea Transportation Service announced its first 5-year tanker contract this month, under which it will use four "supertankers" built for the Orian Shipping and Trading Corp.

The new high-speed 254,000-bbl. oil carriers will enable the MSTS to lay up eight Navy-owned 141,000 bbl. T-2 tankers in the reserve fleet by next June 30.

One of the new tankers already has been placed in service. Another is expected to be ready next month and the remaining two will be completed by next spring.

A policy of awarding long-term contracts was adopted by the Defense Department a year ago as a means of encouraging private operators to build new faster, larger tankers. Orian, however, has been the only company to show any interest in the program thus far. Department officials said no other deals have been suggested.

The department now has under study a proposal to extend the charter time to as long as 10 years as a means of getting the more modern tankers, but has not yet arrived at a decision.

"Silent Rig" May Spark More Beverly Hills Drilling

Completely soundproofed, this Universal Consolidated Oil Co. test on the studio lot of Twentieth Century-Fox on the outskirts of Beverly Hills, drills so quietly traffic noise from a nearby boulevard drowns out rig sounds. Muffling material for the rig contains 50 per cent more fiber-glass padding than used previously. If it is successful, additional wells will be slanted from the 200 by 300-ft. drilling island.

WEST COAST

Union Fights Stock Plan

LOS ANGELES.—A voluntary stock purchase plan Richfield Oil Corp. offers its employes was challenged by the Oil Workers International Union (C.I.O.) in a complaint filed here with the National Labor Relations Board on November 16.

The union charged the company installed the plan without first bargaining with it. Richfield officials said the plan is not a proper matter for bargaining; that it is a voluntary offer by the company to help employes purchase stock.

Court Battle Predicted

LONG BEACH.—Litigation between the state and the City of Long Beach as to which holds title to potential oil reserves lying offshore a 2,200-ft.-strip of beach inside city limits was forecast here last week.

California originally gave title to the narrow strip to the city. The latter returned the area for use as a state beach. In doing so, it now claims, it did not cede title to offshore rights out to the 3-mile limit which was conveyed in the original grant.

State Assemblyman W. W. Bradford of Long Beach declared, "The state claims this strip and probably will go to court to get it."

Bradford made the statement while arranging for a special hearing of the Assembly's Committee on Manufacturing, Oil and Mining Industries scheduled to be held here January 14, 1954. The group will hear testimony on whether pending offshore drilling might cause damage through subsidence in the Belmont Shore, Belmont Park, and Naples areas.

Shore Line Oil Ban Sought

SAN FRANCISCO.—An appeal for state legislation to prohibit oil exploration and drilling operations along the 16-mile Santa Barbara County, California, shore line has been made by Santa Barbara Dist. Atty. Vern Thomas.

Thomas told the state Senate interim committee on Oil and Gas Development on State Lands that the restriction was needed to preserve the beauty of Santa Barbara's shore line.

Drilling Rate to Slacken

LOS ANGELES.—California operators so far this year have completed about 125 more wells than they did during the same period of 1952 but the increased rate probably will not hold during the remainder of the year.

In the past 2 months development completions have decreased, particularly in the San Joaquin Valley area. Wildcat drilling, however, is continuing to exceed the level of earlier in the year.

Union Oil Co. reported in its recent monthly letter to employes that because of ample supplies no development wells would be completed in the Coastal division during the remainder of the year. Some development work will be continued in the other divisions.

ROCKY MOUNTAIN

Early Sampling Needed

Valuable reservoir information can be obtained, but only time to get it is soon after discovery, A.I.M.E. told

Joseph A. Kornfeld

CASPER, Wyo.—Samples of reservoir fluids must be obtained early in the productive life of an oil field if the data obtained is to be accurate enough to guide field development and operation of the highest efficiency.

In an address before the annual meeting of the Wyoming section of the American Institute of Mining and Metallurgical Engineers, T. M. Kennerly declared, "we have only one opportunity to produce data of high accuracy which will be used throughout the life of the field." Kennerly, manager of the reservoir fluid division of Core Laboratories, Inc., Dallas, outlined two methods for obtaining reservoir samples from which data is obtained.

He reminds his listeners that reservoir data are necessary in planning every pressure maintenance or secondary-recovery project in addition to many other operations affecting the efficient operation of the field.

Sampling methods . . . Early sampling of the reservoir is imperative, Kennerly said, regardless of whether samples are collected with subsurface equipment lowered into the well or collected at the surface separator and later recombined to the gas-oil ratio measured at the time the samples are obtained.

If representative samples are to be obtained, the well must be conditioned for a period of a week or even longer. Undue haste caused by fear of lost production, he warned, may lead to invalid data which are "bound to result in more serious economic losses."

Field procedures . . . One week before a bottom-hole sample is taken, the production rate of the well should be reduced one-half for a 48-hour period. Then, reduced one-half for another 48-hour period. This reduction of flow gradually reduces the size of the area around the well bore in which pressure has been drawn down by production.

After a 96-hour period of reduced flow, the well should be shut in and allowed to remain static for 24 to 72 hours to allow full-pressure buildup. Well conditioning procedures, Kennerly reminded, are dependent on characteristics of the individual well and may vary from one well to another.

Static pressure traverse is then made to determine reservoir pressure. Intermediate stops are made in the traverse over small increments at depth intervals near both the top and bottom of the well to determine presence of gas-oil and oil-water interfaces.

If pressure traverse indicates no water in the well, a Wofford fluid sampler, with valves open, is lowered to the completion interval. The well is allowed to produce a small amount of fluid to permit fresh reservoir fluid to flow into the well bore at the bottom and the sample is obtained.

Well-site checking . . . After the sample is brought to the surface, mercury is injected in small measured increments to determine saturation or bubble-point pressure of fluid at atmospheric temperature. Kennerly recommended a second sample be tested in the same manner to insure accurate results.

After the samples are checked they are transferred to high-pressure containers for transportation to the laboratory for storage until the fluid study is made.

Surface separator samples . . . An alternate to the bottom-hole sampling method is the collection of surface separator samples for later recombination in the laboratory. Bubble-point pressure and other values have been obtained with close agreement using both methods.

However, the same well conditioning care is necessary as in the bottom-hole sampling method. The well should be flowed through a constant choke for at least 72 hours before sampling with gas-oil ratio measurements made over three 24-hour periods. To obtain stabilization, the three ratio measurements should check within 3 per cent.

When stabilized well conditions have been ascertained, samples of separator gas and liquid should be collected in pressure bombs and transported to the laboratory for recombination and detailed fluid studies.

CANADA

Bacteria at Work

Refinery employs bacterial oxidation to purify wastes

SARNIA, Ont.—Sun Oil Co., Ltd.'s new 15,000-bbl. per day refinery uses an advanced water purification system employing bacterial oxidation of phenol and other organic waste material as double insurance against pollution of the St. Clair River, international boundary between Ontario and Michigan.

The system, according to Gordon R. Henderson, refinery manager, has three separate units for the perliminary segregation and treatment of different types of waste water from the refinery. It represents the first commercial adaptation in an oil refinery of the bacterial oxidation principle which has been adopted as an A.P.I. standard.

Preliminary segregation of waste water streams is a key feature of the system. Waste water is first moved to a conventional process separator which removes any free oil present. From this separator, the water is diluted with a stream of purfied water and is introduced to a large oxidation pit, 90 ft. long, 70 ft. wide and 12 ft. deep.

Oxidation pit . . . The water enters the bottom of the pit through a series of 40 educator jets, which mix the water with air in a finely divided spray. The educators promote circulation and mixing of waste water and activated bacterial sludge, at the same time providing the oxygen necessary for bacterial activity. In this pit, the bacteria reduce the phenol and other organic waste in the water, to a harmless organic material.

Residence time in the oxidation pit ranges from 6 to 8 hours, after which the treated water is drawn off through an overflow line at the top of the 10-ft. water level. In a second separator, bacterial sludge is separated and the clear, purified water is admitted to the St. Clair River. Bacterial sludge is returned to the oxidation pit.

Although this is the first commercial application of this principal to the purification of refinery waste water, three other oil companies are operating experimental plants, and another commercial unit is being built at the Mandan, N. D., refinery of Standard Oil Co. (Ind.). Sun is making all of its data available to the International Joint Commission on Water Pollution, whose engineers are particularly interested in studying it, as a possible solution to the troublesome problem of boundary water pollution.

NIGHT LOADING SCENE on the busy pier at Mena-al-Ahmadi from which all Kuwait's production is shipped. This jetty, one of the world's largest, can load eight tankers simultaneously. In addition, there are five submarine loading lines.

Kuwait Tops Billion

Shaikhdom's cumulative production passes mark in 7 years; output threatens Saudi Arabian leadership in Middle East

OIL production in Kuwait passed another milestone recently when cumulative output topped the billion-barrel mark.

The spectacular rise of Kuwait production during the last 7 years has been one of the most significant developments in the postwar oil industry.

First exports of Kuwait crude were begun by Kuwait Oil Co., Ltd., in June 1946, and the following year output averaged 44,500 bbl. daily. By 1950 production had been raised to 344,000 bbl. daily. In 1951, partly as a result of the loss of Iran's crude, Kuwait production jumped to 560,000 bbl. daily, and last year, to 747,000 bbl. daily.

In September, the last month reported, Kuwait's production amounted to 823,512 bbl. daily, but the average for the first 9 months of this year was 845,246 bbl. daily.

Kuwait is now threatening to edge out Saudi Arabia as the leading producing country of the Middle East. Its output for the first 9 months was only a few hundred barrels below Saudi Arabia's total for the same period.

Kuwait's billionth barrel was produced in October, some 7 years and 4 months after the first commercial shipment. The phenomenal expansion of the shaikhdom's production is shown by comparison with the time taken by some of the world's other leading producing countries to reach this total cumulative output.

WHERE KUWAIT CRUDE GOES
(In 1,000 barrels)

	1952	1950
Great Britain	97,048	28,054
France	56,840	28,169
Netherlands	30,555	17,841
U. S.	27,223	22,361
Italy	14,722	10,632
Belgium	15,526	
Argentina	9,072	
Sweden	4,018	1,423
Others	12,024	4,216

Saudi Arabia hit a billion barrels in 1951 after 16 years of commercial production; Venezuela in 1934 after 18 years; Iran in 1940 after 28 years; and Mexico, in 1923 after 23 years.

Virtually all Kuwait's production has come from the single Burgan field, which with reserves estimated at about 20,000,000,000 bbl. is considered the world's largest oil reservoir. Early this year the company placed in production the newly discovered Magwa area about 8 miles north of Burgan. Another recent discovery, Ahmadi Ridge, just south of the company's tank farm and northeast of Burgan, is now being developed. Since the company began operating in Kuwait, it has drilled only the single 1936 dry hole preceding the Burgan discovery.

The current $1.72 price for Kuwait crude, coupled with existing low tanker rates, allows this oil to compete favorably in many world markets, including those in the Western Hemisphere. The Kuwait price provides for a 15-cent quality discount off the prevailing price in the Persian Gulf. In addition, Kuwait crude is about 10 cents cheaper than Saudi Arabian oil because of its lower gravity (31° as against 35° or 36° for Saudi Arabian crude).

The United States is the fourth largest outlet for Kuwait crude. Imports into this country from Kuwait increased from 20,000 bbl. daily in 1948 to 74,500 bbl. daily last year. Kuwait imports in July and August of this year were, respectively, 122,000 bbl. and 90,000 bbl. daily.

Destinations for Kuwait crude are shown in the accompanying table.

AFRICA

Desert Wells Set

Drilling equipment shipped for Sahara oil search

A DRILLING campaign to assess the petroleum possibilities of a large section of the Sahara Desert in southern Algeria has been launched by several companies.

The first two wildcat wells in the Sahara proper failed to find production and have been abandoned, but they mark only the initial stage of what is expected to be a long-range exploratory program of major proportions.

The wells were Berraine 1, north of Ghardaia, and Toudrara Kahla 1, southeast of Colomb Bashar. They were drilled by Soc. Nationale de Recherche et d'Exploitation des Petroles en Algerie, (S.N. REPAL) owned 50-50 by the French and Algerian governments.

The program undertaken by Regie Autonome des Petroles and Royal Dutch-Shell on Sahara concession acreage has been accelerated, and drilling equipment has been shipped for the drilling of the first well at a point about 75 miles southwest of In-Salah, and a second in the vicinity of El Golea. Drilling is scheduled to start early in 1954.

In-Salah is approximately 500 miles

south-southwest of Algiers. It is situated within one of two large blocks of acreage held by subsidiaries of Shell and R.A.P. in southern Algeria.

Much of central Algeria is now covered by exclusive exploration permits. The southernmost of the concessions are held by the R.A.P.-Shell companies. Other concessions lying generally to the north of these areas are held by S. N. REPAL and Cie. Francaise des Petroles.

So far Shell is the only non-French company participating in the Algerian exploration program. Some American companies have indicated an interest in the area, but work obligations are described as burdensome. The program now under way is expensive and difficult, aimed at finding the large reserves which would be required to justify commercial operations in this remote region. Because of the intense heat, geological and geophysical work and other operations are suspended during the summer months.

Algeria's present production comes entirely from Oued Gueterini field in the northern part of the country. The operating company is Soc. des Petroles d'Amule (S.P.A.) which is affiliated with S.N. REPAL. During July and August the field averaged 262.5 tons per day (1,969 bbl. daily). The oil is moved by pipe line to Oued Djenane on the Algiers-Bou Saada highway, by tank truck to the Bouira railhead, and by tank car to Algiers for transshipment across the Mediterranean to the Shell refinery at Berre near Marseille.

Nigeria Well Finds Oil

Oil has been found by Shell D'Arcy Petroleum Development Co. of Nigeria, Ltd., in a wildcat in southeastern Nigeria, West Africa.

A company statement in London said it was too early as yet to tell if the well is commercial. No details were given on test results.

If commercial production is obtained in Nigeria, it will be the first anywhere in central and southern Africa. Aside from some shows of oil and gas found by French operators in the Gabon area in French Equatorial Africa, there have been no positive results so far from the exploration carried out in a dozen or more regions south of the Sahara Desert in Africa.

The Nigeria well in which oil was found is in Calabar Province, at Akata 50 miles east of Port Harcourt and about 10 miles northwest of Eket. Drilling of the Akata well was started early this year following the company's first and unsuccessful test which was taken to 11,228 ft. at Ihuo in Owerri Province last year. A second rig has been drilling another deep test at Amansiodo about 12 miles west northwest of Enugu.

The Shell D'Arcy company is a 50-50 subsidiary of Royal Dutch-Shell and Anglo-Iranian Oil Co., Ltd. It has been exploring the coastal section of this British West African protectorate for a number of years.

FAR EAST

AIR VIEW OF THE SITE of the new Caltex refinery in the Philippines. The partially completed pier will extend 1,000 ft. into Batangas Bay. In the center of the site will be the crude unit. To the left is the water cooler building and on the extreme right, the administration building.

Refinery Going Up

13,000-bbl. Caltex installation at Batangas Bay on Luzon will be the first refinery ever built in the Philippines

THE only oil refinery in the Philippines is taking shape on the shore of Batangas Bay on Luzon about half way between the towns of Bauan and Batangas.

It is a 13,000-bbl. daily plant being built by Caltex (Philippines) Inc., a locally incorporated affiliate of the Caltex Group. When completed, the project and associated facilities will represent an investment of about 60,000,000 pesos, equivalent to nearly $30,000,000.

Construction on the plant is moving steadily ahead. All the principal foundations have been finished, most of the pumps and heat exchangers set, and considerable work completed on sewer and separator installations and the utilities distribution system. In the crude unit, which is scheduled for earliest completion along with the power plant, process furnaces have been erected, overhead pipe racks completed, and preparations are being made for early erection of the fractionators.

Besides the two-stage crude unit, plant facilities will include a propane decarbonizing unit and fluid catalytic cracking. These two units have progressed only slightly beyond the foundation stage but are scheduled to be finished soon after the crude unit.

Auxiliary facilities will include steam electric power plant, transfer pumphouse, tankage, transfer lines, oil wharf, administration offices, maintenance shops, storehouses, cafeteria, and a small hospital and dispensary. The construction schedule calls for completion of these auxiliary and offsite facilities at various times during 1954 as necessary to meet the requirements of process plant startups.

Plans have recently been made for the further addition of a phosphoric acid catalytic polymerization unit at the Batangas refinery, and design work is now under way. Materials procurement and construction are being moved ahead so that the plant will be completed at the same time as the fluid catalytic cracking unit.

Prime contractor for the project is Foster Wheeler Corp. Head of the Foster Wheeler staff in the Philippines is George E. Jackson. Project engineer for Caltex is W. G. Miller. In addition to the Foster Wheeler contract, certain other phases of the job

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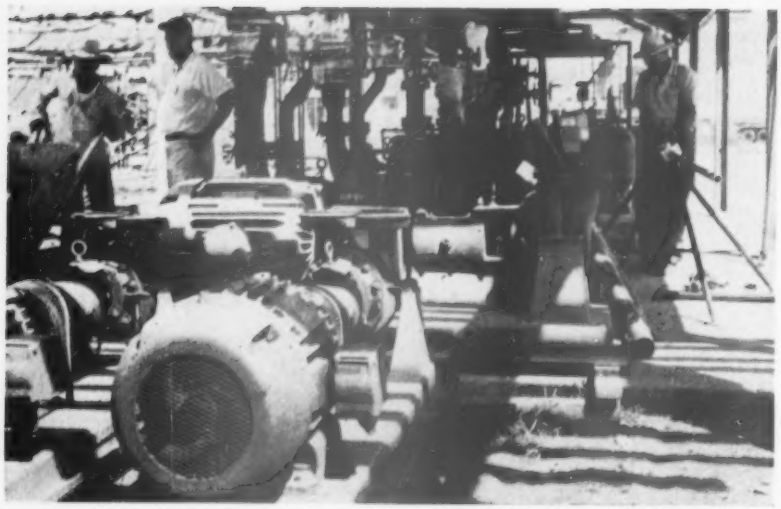


PUMPHOUSE for the crude unit at the Batangas refinery will house 67 pumps, motors and valves.

have been contracted to American Builders, Manila, and to the George L. Tubb Construction Co.

The refinery is designed to operate on a variety of crudes. It will produce a full line of major products, including diesel and fuel oil for ships' bunkers. The site is centrally located for inter-island and ocean-going tankers. It is 72 miles from Manila and readily accessible on hard-surfaced highways. Freight is now being brought in over an existing wooden wharf but work will begin soon on the construction of a new concrete oil wharf which will provide one berth for ocean-going tankers and two additional berths for coastal vessels.

The refinery site covers an area of 259 acres. Preliminary work included the relocation of an active fishing village, the Barrio of Danglayan, of 255 different buildings. The refinery is being built under an agreement with the Philippine Government which was concluded on June 20 of this year. At the same time the refinery site was made a subport of entry, open to both foreign and coastwise trade, by a presidential order.

LATIN AMERICA

Oficina Expanding

Two new Venezuelan fields extend oil area eastward

THE Greater Oficina complex, a concentration of more than 100 oil fields in the southern half of Anzoategui in Eastern Venezuela, has been extended eastward almost to the border of Monagas state by the recent addition of two new fields.

Venezuelan Atlantic's Junta-2, 15 miles east of Mene Grande's Leona field, was a successful completion, but was followed up by a dry hole only 500 yards southwest. In this area marked by thin and weak sands with a tendency to shale out abruptly, it was feared that Junta-2 might prove to be a one-well field.

Junta-4, 900 yards southeast, has now tested one sand for oil and one for gas, and still has two prospects which have given oil shows but have not yet been tested conclusively. Atlantic seems assured of a field.

East from Junta-4 and west from Leona field, Mene Grande made a very satisfactory dual-zone completion of wildcat Adobe-1, and is currently nearing final depth on a second well, ADM-2, which also offers several prospects for production.

New fields . . . Pancoastal recently abandoned its PCXP-1, on its solely owned Pelayo concession a mile west from Meneg's Adobe discovery. However, Pancoastal is now picking coordinates for a second test. In any case, the future of this far eastern corner of Anzoategui seems well assured.

Northeast from Oficina, the Mata area continues to grow, with The Texas Co. (credited with the discovery), Mene Grande and Socony developing separate sizable fields.

Texas' three separate fields (Mata-1, 3 and 5) are spaced over a 15-mile east-west trend. Four rigs are drilling Mata-5 wells, and one is active in each of the others. The most easterly Texas well, Mata 3-2, bottomed near 12,000 ft., is said to have tested three oil sands successfully.

Mene Grande's Zorro-1, east of the Mata-3 area, and near the Monagas border, was a very successful dual-zone well, and a second Zorro well is now drilling. Its Nigua-1, located between the Mata-3 and Mata-5 fields, opened up a new field with 1,200 bbl. of 35°-gravity oil daily from two sands, on American Marcaibo 20-per cent royalty acreage. The second Nigua well, NS-602, is currently completing, also as a 1,200-bbl. well.

Socony has two wells, La Ceibita-2 and North Mata-1, getting ready to test on acreage offsetting Texas' Mata-5 concessions.

Northwest Anzoategui . . . Northwest from Greater Oficina, about 15 miles southwest from the town of Aragua de Barcelona, a new oil province, may be in the making for Anzoategui state.

Mene Grande's Casca-1, rank wildcat 20 miles from any producer, has been undergoing tests for several weeks since it was bottomed at about 10,700 feet. It is now reported completed as an oil well (gage not reported), and Meneg is preparing to spud Casca-2 about 2,000 yards to the southwest.

Shell also has plans for northern Anzoategui, with the first of a series of six tests already spudded. This is VC-2, which will test shallow shows noted during the testing of VC-1, 12,000-footer abandoned as a dry hole 3 years ago. At that time, Shell drilled two such deep tests, both dry, and pulled out of Anzoategui $40,000,000 in the red for surface exploration, construction, and drilling.

Besides VC-2, Shell has programed a 9,000-ft. wildcat at a point between the town of Onoto and Meneg's Casca-1 well, and a series of 6,000-ft. tests in the general area.

Equipment Duties Suspended

The Peruvian Government has authorized the duty-free importation of drilling and geophysical equipment on a temporary basis.

The action was taken in a resolution of the Department of Treasury and Commerce on recommendation of the Petroleum Department. The equipment will be allowed to remain in the country without payment of import duties and other taxes for a period of 2 years, subject to a 2-year extension. If at the end of the period, the firm decides to retain the equipment in the country, the original customs bill is payable.

Contracting companies planning to

work in Peru and seeking the duty exemption must register with the government, giving details on the company, equipment, and personnel. The contractor must post a surety bond guaranteeing final payment of whatever customs bill is due.

Standard Buys Pemex Fuel

The Standard Oil Co. (N.J.) organization has signed a contract with Petroleos Mexicanos to buy 5,000 bbl. daily of Mexican fuel oil over a 1-year period.

The contract calls for the purchases to be made at the world market price less normal discounts for sulfur content and other impurities.

It was the largest contract sale of petroleum products made by Pemex to a major American company during the last 2 years.

Pemex Cracker Contracted

The first cat cracker to be installed by Petroleos Mexicanos will be part of a modernization and expansion program undertaken by Fluor Corp. at Pemex's Minatitlan refinery.

The program will include construction of a topping unit, feed preparation, fractionation, gas-concentration, polymerization and off-site facilities in addition to the T.C.C. catalytic cracking unit.

EUROPE

Britain Starts Gas Study

A 5-year survey of the possibilities of developing natural-gas production in Great Britain is being undertaken by the British Gas Council.

The study, on which nearly $2,800,000 will be spent, is designed to determine if there are sufficient natural-gas resources in Britain to warrant exploitation. The program was encouraged by a report from Dr. G. M. Lees, recently retired chief geologist of Anglo-Iranian Oil Co., Ltd., and also by sharp increases in the cost of coal for the manufacture of artificial gas.

An agreement for the full-scale investigation was signed recently with D'Arcy Exploration Co., Ltd., Anglo-Iranian's exploration subsidiary. Work is scheduled to start this month, with southeast Yorkshire and Lincolnshire among the first areas to be studied.

English Cat Unit Finished

A new fluid catalytic cracking unit at the 90,000-bbl. daily Kent (Shoreport) refinery of Anglo-Iranian Oil Co., Ltd., in England has been completed and is scheduled to be placed on stream in the near future.

The unit has a capacity of 10,000 bbl. daily and is similar to other units erected in the last few years at Anglo-Iranian's Llandarcy and Grangemouth refineries. The three units together represent a capital outlay of nearly $28,000,000.

The Kent refinery came on stream last February with the completion of the distillation unit. The catalytic cracking unit, a vacuum unit for feedstock, and an SO_2 plant for the production of premium-grade kerosine are the major parts of the construction program. Progress is reported by the company in construction of the lubricating-oil plant. The last phase of the program is the erection of a Platformer now under way.

Pollution Curb Sought

The British Government is arranging an international conference of maritime nations to discuss an agreement on means to end oil discharge by tankers and other ships at sea.

The subject of oil pollution of beaches and the resulting loss of marine life and birds has been receiving increasing attention in Britain. The plans for an international conference to prevent what was described as an "appalling and ever growing menace" were revealed by the British transport minister, Alan Lennox-Boyd, at a recent meeting in London of shipowners, conservationists, and municipal harbor authorities.

It is felt that an international convention is necessary to require waste-oil separators on ships and in ports.

Benzole Unit Started

The West German firm, Redestillationsgemeinschaft, G.m.b.H., has begun construction near Gelsenkirchen of a distillation unit for processing technical benzoles from products obtained by high-pressure refining. Monthly capacity of the facility will be 15,000 tons.

Crude benzole will be supplied by Scholven-Chemie, A. G., Gelsenkirchen-Buer. It is obtained from cokeries and, in a hydrogenation process, subjected to high-pressure refining. The new plant will be connected with Scholven by pipe line, and on the same site, BV-Aral, A.G., which is affiliated with Redestillationsgemeinschaft, will construct a terminal for the storage of motor fuels.

Dutch Oil Show Tested

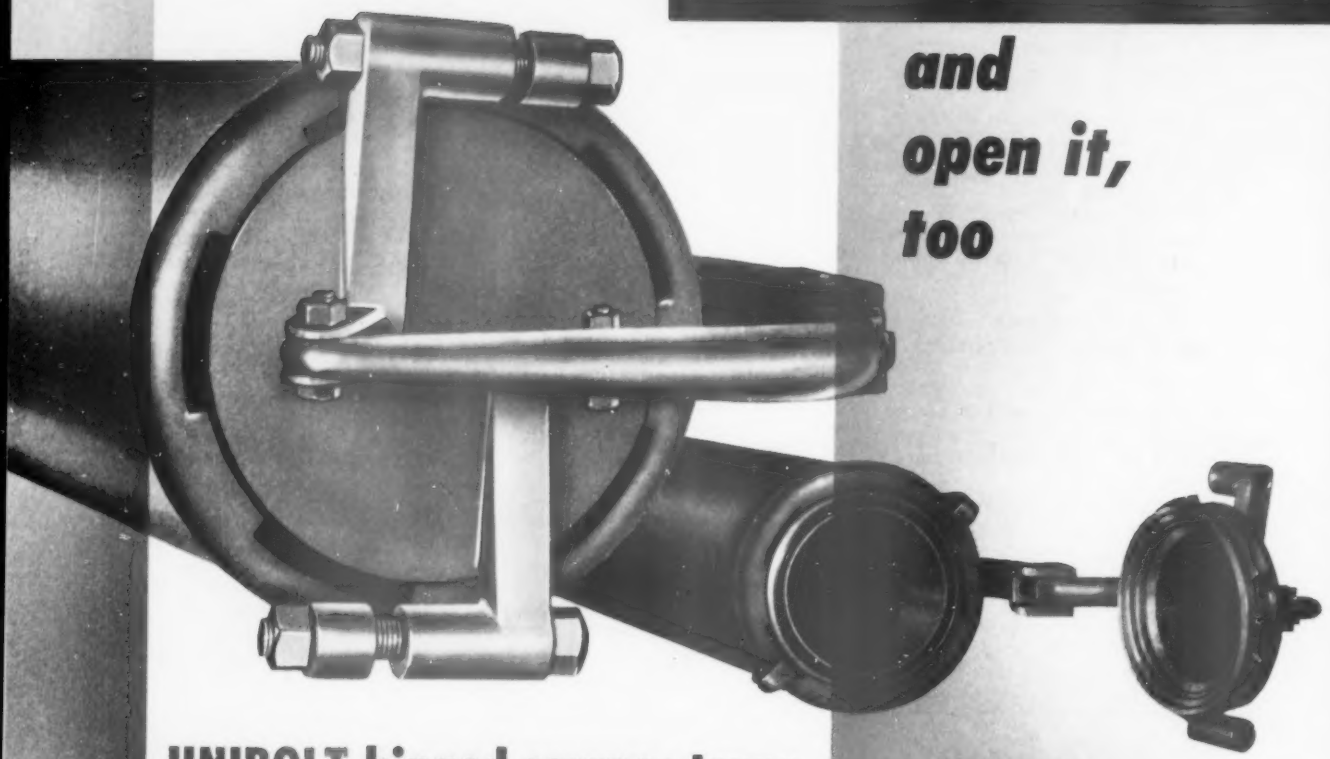
Shows of oil have been obtained in an exploratory well drilled by Nederlandse Aardolie Mij. at a location about 9 miles northwest of Schoonebeek field in northeast Netherlands.

The test near the village of Aalden found oil at a depth of about 3,600 ft. It was not yet known whether the

Journey's End for Indian Refinery Tower

Most advanced of any of India's three refinery projects is the 25,000-bbl. daily Standard-Vacuum plant at Trombay Island near Bombay. This 96-ton Belgian-built fractionating tower was barged 16 miles to the refinery site across Bombay Harbor after being unloaded from a freighter. Here the barge rests on a specially built sandbed after the tide has gone out. The tower is supported on a 26-wheel, 70-ft. trailer while shoring is built at the end of the jetty. The new refinery, to be operated by Standard-Vacuum Refining Co. of India, Ltd., is expected to go on stream next July. Adjacent to the Stanvac plant is the 40,000-bbl. daily Burmah-Shell refinery; a 10,000-bbl. daily refinery is planned by Caltex on the east coast of India.

the best way to Shut Your Trap!



and open it, too

UNIBOLT hinged scraper traps with self-sealing gasket

The self-sealing gasket is shown in cross-section at left. Note the lipped design of the gasket which makes it self-sealing under line pressure.

Just release two bolts and the Unibolt Hinged Scraper Trap swings open like a door. Close it and tighten two bolts. That's how simple and easy it is to operate. There's nothing to drop, no threads to leak, gall, or freeze, no multi-bolt flanges. The Unibolt design places a large area of metal in shear, consequently it is stronger and safer — no danger of failure under line surges or vibration.

Pipeliners everywhere are using Unibolt closures and couplings for scraper traps, blowdowns, strainers, mist removers, and other large diameter pressure vessels. Bulletin PL-510 presents the details on all Unibolt Pipeline Products. A copy will be sent gladly on request.

THORNHILL CRAVER CO.

P. O. BOX 1184 HOUSTON, TEXAS

Topping Unit Starts Trip to Aden Refinery

This British-built topping unit, designed by E. B. Badger & Sons, Ltd., will become a part of the Anglo-Iranian Oil Co., Ltd., refinery at Aden, independent kingdom on the Persian Gulf. It was manufactured by Newton, Chambers & Co., Ltd., and is composed of naphthalene, kerosene and gas oil sections, each containing six trays of bubble caps.

discovery would be commercial. The operating company is an affiliate of Royal Dutch-Shell and Standard Oil Co. (N. J.).

N.A.M. has begun commercial production at Rijswijk on the southeast edge of The Hague. This discovery made last spring gives the Netherlands its first oil production aside from Schoonebeek which was discovered during the war and now accounts for some 14,000 bbl. daily.

Rijswijk produces crude of 32° gravity from Lower Cretaceous formations. The oil is being barged from the Rijswijk harbor to the Shell refinery at Pernis. Preparations are being made for the drilling of two additional wells in the area.

ASIA

Indian Exploration Begun

An intensive exploration program is being launched in northwest India by Assam Oil Co., Ltd., a subsidiary of Burmah Oil Co., Ltd.

The company's decision to undertake the program results from the discovery earlier this year of new production at Nahkortiya near the company's existing Digboi field. The Assam company had previously carried on exploration in this part of India for years with negative results.

The program now being undertaken will cover an area of more than 5,000 sq. miles extending from the Mishmi Hills in the northeastern extremity of Assam to the Mikir Hills in the southwest. Between the two sections lies the flat alluvial plain of the Brahmaputra Valley.

Aerial magnetometer, gravity, and reflection seismograph will be employed. In the seismograph work, the company will make its first use of helicopters.

Four sands are now being tested in the Nahkortiya well, 18 miles southwest of Digboi field, but further drilling is necessary before estimates of the size of the reservoirs can be made. A No. 2 well is due to be started in the near future.

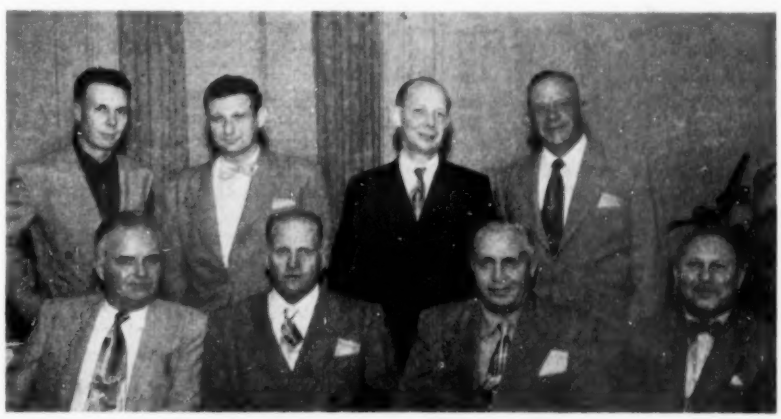
International Briefs

A new catalytic polymerization plant has been placed in operation at the Ras Tanura refinery of Arabian American Oil Co. in Saudi Arabia. The unit, built at a cost of nearly $2,000,000, will produce about 500 bbl. daily of high octane gasoline initially, and this output will increase appreciably with later modifications to the equipment. Construction of the unit is a part of an improvement and expansion program at Ras Tanura which also included construction of a new crude topping unit. Runs at Ras Tanura have reached an average of nearly 240,000 bbl. daily in recent months.

The fifth annual meeting of the European Association of Exploration Geophysicists will be held December 2-4 in Milan, Italy. Twenty-four technical reports and papers will be given during the 3 days. December 5, the group will be guests of Azienda Generale Italiana Petroli on a visit to A.G.I.P.'s geological and geochemical laboratories and to an A.G.I.P. seismic party.

The recent payment of $8,689,257.85 by the Mexican Government to Royal Dutch-Shell was the sixth annual instalment of the 15 to be made in payment for company properties expropriated in 1938. *(The Oil and Gas Journal, October 5, page 153).* The payments are made under an agreement signed and ratified by the Mexican Congress in 1947. The Mexican Government agreed to pay $81,250,000 plus 3 per cent annually from March 18, 1938 to September 1948 in 15 equal annual installments of $8,689,257.85.

Petroleos Mexicanos has rescinded its order to shut down and dismantle the old Arbol Grande refinery near Tampico *(The Oil and Gas Journal, October 5, page 153).* Workers at the refinery, who had resisted the plan, were asked to increase productivity of the plant. The 23,000-bbl. daily refinery, which has been operated at a loss for several years, is one of the first refineries built in Mexico.



Los Angeles Nomads Entertain Foreign Guests

The eight guests at a November meeting of the Los Angeles chapter of Nomads represented a pretty good cross section of the world's oil activity. Seated, left to right, they are Leo L. Goss, Santa Fe Drilling Co., Lebanon; Fred Lay, Iraq Petroleum Co., Iraq; J. C. Green, Qatar Petroleum Co., Qatar; and E. V. Corps, Burmah Oil Co., Pakistan. Standing, left to right, are Joe E. Spellacy, S.V.P.M., Sumatra; Sam G. Miller, Empresa Colombina, Colombia; John Smith, Oil Well Engineering Co., England, and W. S. Schmittou, Santa Fe Drilling Co., Venezuela.

Popular Executive

Dodger fan and production expert is Aramco's Dale Nix

QUIET, genial Dale Nix has earned a reputation as one of the most popular officials of Arabian American Oil Co. at the 505 Park Avenue building in New York where he makes his headquarters.

Nix has a wide knowledge of oil operations in the Middle East, and his judgment is respected throughout the organization. His office door is usually open, and he has an easy patience and friendliness which accounts for the fact that he is known and liked by many Aramco employes.

Nix's background is in oil production, and his present duties as vice president in charge of technical and supply services place him in one of the key positions with the world's largest producing company. (Last July Aramco averaged 909,677 bbl. daily, greatest production ever achieved by a single company).

While some observers of Aramco's affairs may rightly think that its weightiest problems are in the field of politics and government relations, the technical and operating end of the company is a major responsibility. Difficult supply problems arising out of working in a remote desert 10,000 miles on the other side of the world are met and solved almost daily. The physical task of moving this volume of oil—about as much as the combined production of Oklahoma and Kansas — requires constant study and surveillance. Nix travels frequently between New York and Dhahran.

Nix went to the Middle East in 1933 with Bahrein Petroleum Co., Ltd., the year after this Standard of California subsidiary made the Bahrein discovery and opened up the first Persian Gulf production below the Tertiary. He served 4 years, first as petroleum engineer, then as assistant manager, before returning to the United States to do petroleum engineering work in Socal's foreign department in San Francisco.

He had been associated with Aramco since 1940 successively as: supervisor of producing operations, assistant to the vice president, manager of the producing, pipe lines and transport department, general manager of oil operations, and since April of last year as vice president. His career in petroleum engineering led to the award last June of a distinguished-service medal by Colorado School of Mines, where he was graduated in 1926.

DALE NIX

. . . Rolling the first ball to open the season for Aramco's bowling team.

Nix is a native of Tonkawa, Okla., which is on the Salt Fork of the Arkansas River about 15 miles west of Ponca City. He grew up in the midst of some of Oklahoma's early oil development, attended high school in Ponca City, and in 1916 was working as a meter reader in the Augusta, Kans., field. After 2 years in the Army during World War I and 3 years in an assortment of jobs, including one in a Pueblo, Colo., steel mill, he resumed his education at Denver University and later, Colorado School of Mines.

After graduation, Nix joined the old Marland Oil Co. and worked 2 years in the Panhandle and West Texas as a petroleum engineer. From 1928 to 1933 when he went to Bahrein, he was a petroleum engineer in West Texas for The California Co., and during this time was a charter member of the Yates Engineering Committee.

Nix has no spectacular hobbies. He is a baseball fan and this year made the pardonable mistake of switching his allegiance from the Yankees to the Brooklyn Dodgers. He is also an out-of-practice bowler who at one time could rack up a score of 180. He and Mrs. Dix have one son, Charles, an Air Force lieutenant in Germany.

Jack H. Vestal has resigned as assistant to the chief geologist of Murphy Corp. at El Dorado, Ark., to become a consulting geologist. He had been with Murphy for 5 years.

Lloyd Alexander, formerly drilling and production superintendent for Southern Natural Gas Co., has opened offices as a petroleum consultant in Shreveport.

B. I. (Ben) Routh, chief engineer for Canadian Gulf Oil Co. at Calgary, Alta., since 1951, has joined Rice Engineering & Operating, Inc., as manager at Chase, Kans. The firm was recently reorganized for consulting work and oil-property management.

Allen R. Guiberteau, with Pan American Production Co. at Houston, has been promoted from junior production engineer to production engineer.

J. E. Heston has been elected a vice president and director of Cities Service Oil Co., with headquarters in Bartlesville, Okla. He had been coordinator of oil production for the firm in New York. Heston joined Cities Service in 1930 as a geological scout and held various geological and engineering positions until 1941 when he was named assistant director of production of the Petroleum Administration for War. He returned to Cities Service in 1945.

Fred Claiborne, assistant to the safety supervisor of Stanolind Oil & Gas Co. at Tulsa, has been elected vice president of the southwestern region of the American Society of Safety Engineers, which includes 11 chapters in Oklahoma, Texas, northern Louisiana, and southern Kansas. He is currently serving a 3-year term as a member-at-large on the society's national executive committee and is a past general chairman of the organization's Tulsa chapter.

Dr. G. M. Lees and **R. Davies,** geologists, have retired from Anglo-Iranian Oil Co., Ltd. Dr. Lees joined the firm in 1921 as assistant geologist and was promoted to chief geologist in 1930. He was prominent in the firm's oil discoveries in the Middle East and England and was awarded the Bigsby Medal of the Geological Society in

Left: Bethlehem Sucker Rods come securely bundled in packages of 80 or 100 rods. Each rod is held in position by spacer grooves, preventing contact with other rods. *Right:* At their destination, Bethlehem rods can be unloaded quickly and easily with a gin-pole truck and lifting rig.

THESE RODS ARRIVE IN PERFECT CONDITION

...because unit load absorbs shock in transit

You needn't be concerned about the condition of sucker rods when they reach your yard—not when you use Bethlehem Sucker Rods. For Bethlehem rods come well bundled in a unit package. The packages form a "floating" load which protects each individual rod by absorbing the shocks encountered in transit. The rods reach you as straight and true as the day they left the plant.

The Bethlehem unit package, containing 80 or 100 rods, is made up of grooved steel spacers. The rods fit snugly in the grooves, where they are prevented from bending or kinking, or making contact with other rods.

Each package is held together by bolts which clamp top and bottom wooden binders. The package is loaded on heavy blocks. Tie-rods and bracing make the load a single, solid unit.

The design and size of the package permit it to be moved quickly and economically by a gin-pole truck and lifting rig, whether the rods are trucked to the job or to storage.

Bethlehem rods come in four types, covering a wide range of pumping conditions. We also produce a complete line of rod accessories. Full details are available from the nearest Bethlehem district sales office or sucker rod distributor. Or write direct to us at Bethlehem, Pa.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM *Sucker Rods*

BETHLEHEM STEEL

1943 for his work. Davies joined the company in 1923 as a geologist in Iran and in 1935 was appointed senior geophysicist for operations in that country. He also worked in Venezuela and Australia, and was made acting chief geophysicist in 1941 in charge of the United Kingdom's wartime geophysical surveys.

R. F. Morlock, petroleum engineer, has been transferred by The Texas Co. from West Columbia, Tex., to Pierce, Tex.

L. L. Gude has resigned as general superintendent of Oil Development Co. of Texas at Amarillo to become a consulting petroleum geologist and engineer. He is also associated with Ken Woods Co., drilling contractor, at Hobbs, N. M.

Angelos T. Chatas, formerly technologist in Magnolia Petroleum Co.'s field-research laboratories at Dallas, has been made reservoir engineer at Caracas, Venezuela, by Socony-Vacuum Oil Co. of Venezuela.

John F. Shaw has been named assistant manager of the central district office in Chicago of the petrôleum chemicals division of E. I. du Pont de Nemours & Co., Inc. He succeeds **Barrett B. Russell,** who has been transferred to Wilmington, Del.

Minckler Receives Scroll

Robert L. Minckler, president of General Petroleum Corp., Los Angeles, accepts an award "for conspicuous and notable service to the people of the State of Washington" from Albert Balch, Seattle, president of the Washington Association of Realtors. Balch presented the award in Los Angeles during the National Realty Convention. General Petroleum now has a 35,000-bbl. refinery under construction at Ferndale, Wash.

Lewis R. Pomeroy, III, formerly with Brazos Oil & Gas Co. at Bay City, Tex., has joined Continental Oil Co. at Houston as a petroleum engineer.

J. CAMPBELL, JR.

John O. Campbell, Jr., has been appointed assistant manager of Carter Oil Co.'s crude-oil purchasing department in Tulsa, and **Dean W. Fenton** has been made crude-oil representative. Campbell, with Carter since 1939, has been head of the natural-gas and gas-products section of the crude-oil purchasing department for the past 6 months. From 1948 until last May, he was general gasoline superintendent.

Charles L. Lunsford, senior chemist in Tulsa for Dowell Incorporated, has been elected chairman of the Tulsa section of the American Chemical Society. **Alvin C. Broyles,** Carter Oil Co., was named chairman-elect, and **James D. Wolfe,** Mid-Continent Petroleum Corp., treasurer.

Lester B. Swan, formerly assistant general manager of Dowell Incorporated, Tulsa, has been named executive vice president of Brazos Oil & Gas Co., with headquarters in Houston. **Dr. W. W. Love,** formerly district manager of Dowell at Salem, Ill., has replaced Swan in Tulsa. Swan joined Dowell in 1940 and from 1949 until 1952 was in Venezuela with United Oilwell Service, S.A. All three firms are wholly owned subsidiaries of Dow Chemical Co., Midland, Mich. Swan also worked 5 years for Stanolind Oil & Gas Co. in Kansas before joining Dowell.

J. A. Dinwiddie has been promoted to research specialist in the research and development division of Humble Oil & Refining Co., Baytown, Tex. He will engage in research directed to development of new or improved catalysts, fundamental studies of catalytic chemistry, and consultations on catalyst problems. **E. O. McBride** has been promoted to technical specialist in the technical-service division, and will be engaged primarily in developing process designs for new installations and following their initial operations in the refinery. **F. H. Field** has been made senior research chemist in the research and development division, and will study hydrocarbon-ion appearance potentials, use of instruments for calculations of bond strengths, and develop equipment to allow studies at reduced pressure of the gas-phase relations of carbonium ions.

Henry L. Waszkowski, Jr., formerly assistant district superintendent of Magnolia Petroleum Co.'s Falfurrias, Tex., producing district, has been transferred to the New York office of Socony-Vacuum Oil Co., Inc. He has been succeeded by **Homer A. Martin,** who had been production foreman in the district. Other changes include **Garland C. Rutherford,** from production foreman in the Pegasus district of West Texas to assistant district superintendent at Duncan, Okla., and **G. W. Walker,** formerly petroleum engineer in the Lake Charles, La., district, to assistant foreman in the Falfurrias district.

Aubrey Weatherholt has been appointed to the newly created position of assistant chief engineer of Cities Service Oil Co. and Cities Service Pipe Line Co., with headquarters in Bartlesville, Okla. Weatherholt, who has been Kansas district superintendent at Oil Hill for the pipe-line company since 1949, will assume his new duties December 1. He joined Cities Service in 1937.

Joseph C. Kitchens, formerly district geologist for Pure Oil Co. at Tyler, Tex., has joined Three States Natural Gas Co. as district geologist at Tyler.

Victor R. Gallagher, Evansville, Ind., has been named chairman of an advisory committee which will assist the Indiana State Conservation Department's Oil and Gas Division. Gallagher is owner of Gallagher Drilling Co., president of Victor Drilling, Inc., and vice president of the Indiana Oil and Gas Association. Other committee members are: **Alfred Kiltz,** president of Independent Oil Producers and Land Owners Association and exploration manager and chief counsel of Farm Bureau Oil Co.; **Joe Vol Butt,** president of the Indiana Oil and Gas Association; **Harvey Snyder,** a director of the Indiana Oil and Gas Association; and **Robert Sullivan,** professor of law at the University of Notre Dame.

PERSONALS

NEW PRESIDENT of the Pacific Coast section of the American Association of Petroleum Geologists is E. Harold Rader, center. Russell Simonson, immediate past president of the group, is pictured on the left, and John E. Adams, Standard Oil Co. of Texas, national A.A.P.G. president, is on the right.

Officers Elected at Annual Joint Meeting

LOS ANGELES. — New officers elected by the Pacific Coast sections of the American Association of Petroleum Geologists, Society of Exploration Geophysicists, and Society of Economic Paleontologists and Mineralogists at their annual joint meeting here include:

A.A.P.G.—E. Harold Rader, Standard Oil Co. of California, president; A. T. Lee, Sunray Oil Corp., vice president; and George Feister, Union Oil Co., secretary.

S.E.G.—Joe B. Hudson, Humble Oil & Refining Co. president; H. C. Bemis, Standard of California, vice president for the southern district; R. J. Wells, Richfield Oil Corp., Bakersfield, vice president for the northern district; and F. F. Lambrecht, The Texas Co., secretary-treasurer.

S.E.P.M.—John Ruth, Standard of California, president; and Wayne Elliott, Richfield Oil Corp., secretary-treasurer.

Registration at the 2-day joint meeting was approximately 1,000.

John W. Rold has been transferred by The California Co. to New Orleans as area geologist in the firm's southwestern district. For the past 6 months, he has been seismic supervisor of the northwestern division, supervising crews in Montana and North and South Dakota.

C. T. Hester, petroleum engineer with Humble Oil & Refining Co.'s Southwest Texas division office at Corpus Christi, has been promoted to senior petroleum engineer. Other changes include: **L. E. Goss,** petroleum engineer at Corpus Christi, to Houston; **C. L. Sparkman,** tool pusher in the Potash district, Louisiana division, to the Athens district, East Texas; **A. W. Cook,** tool pusher at Grand Isle district, Louisiana, to the Gulf Coast division; **Rex Parrish,** tool pusher at Friendswood district, Gulf Coast division, to assistant district superintendent at Friendswood, Tex.; **David Johnson,** assistant district superintendent of McCamey district, West Texas division, to Friendswood district, Gulf Coast division; **E. E. Byrd,** assistant district superintendent at Conroe, Tex., to district superintendent of the Thompsons district, replacing **C. E. Stanley,** who recently retired. The Galveston Bay district has been consolidated with the Goose Creek district, with **D. C. Rhodes** as district superintendent and **W. W. Denyer** as assistant district superintendent.

M. H. Robineau, president of Frontier Refining Co., Denver, was reelected president of the Independent Refiners Association of America at its annual meeting recently in Chicago. Other officers elected are: **Max M. Fisher,** Aurora Gasoline Co., Detroit, first vice president; **Clarence W. Rice,** El Dorado Refining Co., El Dorado, Kans., second vice president; and **James P. Dunnigan,** Producers Refining Co., West Branch, Mich., secretary-treasurer. Directors elected include: **R. B. Kahle,** president of Eastern States Petroleum Co., Houston; **R. P. Hargis,** president of Premier Petroleum Co., Longview, Tex.; **R. O. Anderson,** Malco Refineries, Inc., Roswell, N. M.; and **Lloyd Freese,** Bell Oil & Gas Co., Tulsa.

Dr. M. L. Owens has been promoted to group leader in the research department of Monsanto Chemical Co.'s Texas division at Texas City. He joined Monsanto in 1951 as a research chemist.

C. F. Barber, formerly an independent geologist at Lake Creek, Tex., has joined D. D. Feldman Oil & Gas as a geologist at Houston.

A. W. Peake, president of Standard Oil Co. (Ind.), was elected president of the 25-Year Club, succeeding **Rawleigh Warner,** chairman of the board of Pure Oil Co., at the club's recent meeting in Chicago. Other officers named include: **R. G. Follis,** Standard Oil Co. of California, governor for the Pacific Coast region, and **Paul G. Blazer,** Ashland Oil & Refining Co., governor for the North Central region. They succeed **P. E. Lakin,** Shell Oil Co., and Peake, respectively. Reelected governors were **Guy Tate,** Magnolia Petroleum Co., for the South Central region, and **Fayette B. Dow,** National Petroleum Association, for the East Coast region. **H. T. Ashton,** Socony-Vacuum Oil Co., Inc., was reelected executive secretary.

DEATHS

L. M. Wilson, 55, Katonah, N. Y., secretary and a director of Pan American Petroleum & Transport Co., Inc., died of a heart attack in Houston November 18. He was in Houston to attend a meeting of the board of directors of a subsidiary, Pan American Production Co.

O. L. Rash, 75-year-old independent operator, died recently in Houston following a long illness.

Harry J. March, 54, vice president of Signal Oil & Gas Co., Los Angeles, died of a heart attack recently at his Balboa summer home.

Ernest E. Combs, 71, pioneer California independent oil producer, died recently at his home in Long Beach. Combs entered the oil industry in 1920. In 1933 he and associates formed the Termo Co., of which he became vice president and general manager.

James H. King, 61, of Scarsdale, N. Y., died recently at a hospital in New Rochelle, N. Y. He was vice president and director of Babcock & Wilcox Co. of New York.

1 Truck loaded with pipe bundles travels alongside ditch with one man distributing the bundles weighing 80 lb.

2 Joining the plastic pipe into a continuous length was accomplished by means of a solvent cement brushed on.

New All-Plastic Pipe Line Handles Montana Crude

Paraffin-base crude oil containing corrosive sour gas dictated choice of butyrate plastic pipe. This pipe resists corrosion and paraffin clogging.

THE first crosscountry pipe line entirely of plastic has been completed at Poplar, Mont. It is in service, delivering crude oil from a producing field in the Williston oil basin to a shipping point on the Great Northern Railway. More than 9 miles in length, the plastic line is the longest of its kind on record.

The pipe used in this line is 3-in. i.d. with a wall thickness of 0.125 in. and was produced of 100 per cent pure cellulose acetate butyrate plastic* by the extrusion process. Designed to operate at a maximum pressure of 90 psi. at a temperature of 60° F., the line is planned to deliver 3,000 bbl. of crude oil per day, with facilities for increasing the capacity to 4,000 bbl. daily in the future. The line is presently handling 1,700 bbl. per day.

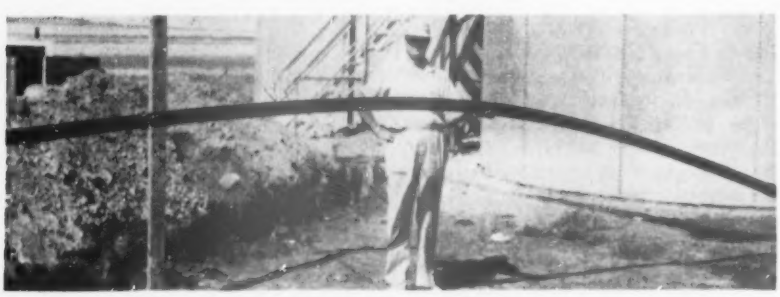
*Pipe used is Tenite butyrate plastic, manufactured by Eastman Chemical Products, Inc.

Piping system . . . This line is an all-plastic system from the four 1,000-bbl. tanks at the lease to the 10,000-bbl. tank at the loading dock, with the exception of standard 125-lb. cast-iron ells and tees and the pumps in each pumping station. At the 10,000-bbl. tank, plastic pipe is used to the valve and the oil enters the tank at a point 2½ ft. from the bottom. Also, the bypass piping going into the top (25 ft. 4 in. high) of the tank is all plastic.

Location of the crude-oil storage tank battery from which the pipe line runs is on the Huber lease within the Fort Peck Indian Reservation. The elevation of the tank battery is 2,090 ft. above sea level. The railroad siding at Poplar where the butyrate plastic pipe line ends is 1,940 ft. above sea level. The drop from the storage tanks to the delivery point is, therefore, 150 ft. This would provide a natural gravity flow. However, between the storage tank battery where the line begins and the terminus at the Poplar railroad siding, the line must cross a point on the terrain where the elevation is 2,100 ft. In order to maintain the desired flow, three booster pumps, each capable of pumping against a head of 78 psi., have been installed. Booster pump No. 1 is installed at the head of the line. Booster pump No. 2 is located approximately 13,750 ft. from pump No. 1, and booster pump No. 3 approximately 17,900 ft. downstream from pump No. 2.

Installing three pumps of smaller head capacity as required along the line makes possible a savings in the cost of installation and operation, while providing both flexibility and dependability of operations. The capacity of the line can be varied by operating only one or two pumps. The line is capable of flowing at a reduced rate in the event one pump is down for repairs. All this is accomplished without installing spare pumps. Total cost of the three pumps was less than for one high-pressure pump. Only one pump is in service at the present time.

Plastic selection . . . Important considerations in the choice of butyrate plas-



Journal Staffer Henry D. Ralph demonstrates light weight of pipe by holding length of pipe, which is 20 ft. long and weighs only 13 lb.

3 Connection of the plastic pipe line was made at storage tank battery by means of a special flange adaptor.

4 After pipe has been assembled by means of slip-sleeve solvent-welded couplings, it is lowered into the ditch.

tic pipe for the line were its high resistance to corrosion, apparent freedom from paraffin clogging, and low-cost installation. The crude oil to be delivered through the line is rated 40.1° A.P.I. It is a paraffin-base oil containing corrosive sour gas and consists of the following:

Component	Gravity	Per cent
Gasoline	63.1° A.P.I.	28.4
Kerosine	43.5° A.P.I.	18.5
No. 2 gas oil	37.1° A.P.I.	14.0
Residue	29.1° A.P.I.	26.1

Experience has shown that steel pipe carrying this oil not only corrodes badly but clogs with paraffin within a relatively short time. At the lease well No. 4 gave an excessive amount of trouble. The operator tried for 9 months to keep a 750-ft. line from the well to the treater house free of paraffin. About June 1 the well was shut in, due to the excessive cost of cleaning the line.

On July 16 a plastic pipe line was installed from well to treater, and the well has been producing about 400 bbl. daily since that time. Periodic inspection of the line shows no accumulation of paraffin—after 3 months' operation, the inside of the pipe looks like it did the day it was installed.

Installation . . . Installation of the butyrate pipe line was made with a crew of three workmen using slip-sleeve couplings and solvent cement. Where it was necessary to cut the pipe to fit, an ordinary handsaw was used. Joining the pipe together in a continuous length required a total working time of about 5 days, averaging approximately 10,000 ft. per day.

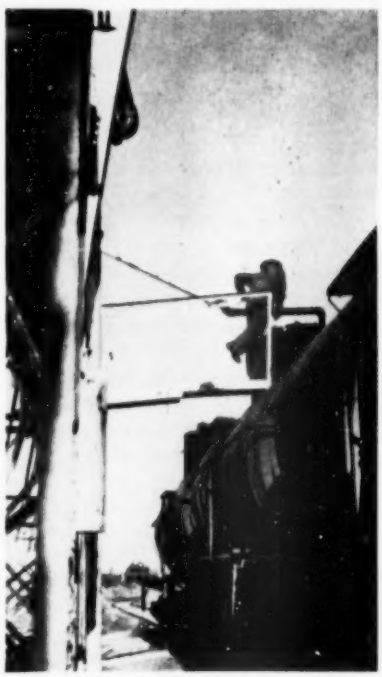
The speed and ease with which the pipe was handled is due to its light weight. One 20-ft. section of the pipe weighs only 13 lb. as compared with 153 lb. for a section of steel pipe of the same diameter. This difference is even more impressive when it is considered that a larger diameter of steel pipe would be required to deliver the same amount of oil with the pumping head available.

Total labor used on the installation of the pipe line—including ditching, laying, and covering — was only six men. There was practically no weight problem in hauling the pipe. In a timed operation four men loaded 5,000 ft. of the 3-in. butyrate pipe on a trailer in 15 minutes. It took only 10 minutes to drop off the 5,000 ft. of pipe, in bundles of six 20-ft. lengths each, at spaced intervals alongside the ditch prior to joining it together. Twelve revolutions of one marked tire wheel was the measure for dropping each bundle of pipe.

Ditching . . . The butyrate pipe was joined together on the ditch bank in a continuous length and then lowered by one man into the ditch. It was snaked in the ditch so that the pipe touched the opposite sides of the ditch about every 200 ft. This was done to allow for contraction and expansion due to any temperature changes that may occur.

Because of the depth of the frost line in northeastern Montana, the ditch was dug about 5 ft. 4 in. deep. This would assure maximum flow of oil during the winter months. The ditching was accomplished by a conventional rotary ditch digger with a ditching speed of about 800 to 1,000 ft. per hour. A blade-type earthmover was used to cover the pipe.

The pipe line is owned by Plastic Service Lines, Inc., 1440 West Thirteenth Avenue, Denver. R. W. Greene, Casper, Wyo., and Luther Symons, Denver, supervised all phases of the project. The engineering was done by J. A. McCormack, Denver; Floyd Oliver, Greeley, Colo., was consultant. Hadyn Thomas & Sons, Billings, Mont., were the construction contractors. The line is leased to C. C. Thomas, Denver. Johnson Plastic Corp., Chagrin Falls, Ohio, extruded the pipe. The butyrate plastic used is marketed by Eastman Chemical Products, Inc., Kingsport, Tenn.



5 Tank-car siding and loading platform at Poplar, Mont., where the plastic pipeline ends.

Do You Keep Books on Your Rotary Drilling Lines?

Here are some charts to help you get longer, safer service

PROPER care of drilling lines adds up to safer and longer service from wire rope. This important investment can be protected by an enlightened study of loading.

Normally, the bulk of service by the drilling line is performed during round tripping, drilling, and coring. Therefore, an accurate accounting of the ton-miles of work incident to these operations will afford a sound basis for proper utilization of the line.

Round-Trip Ton-Mile Formula

Equation 1 is recommended for use in evaluating service from rotary-drilling lines. This equation is based on certain assumptions, and a given cycle of operations in drilling.

It is assumed that:

1. When the pipe is in the hole, it is under the full buoyant effect of the mud.
2. The bit assembly has the same unit weight as the drill collars.
3. Friction going in the hole balances and offsets that coming out.
4. The drill-collar and bit assembly have their weights concentrated in the first stand.
5. The unit weight of drill pipe is the actual weight with an average tool joint. The lengths are 21, 29, and 42 ft. for Ranges 1, 2, and 3, respectively.

The normal cycle of operations in drilling is:

1. Drill ahead length of the kelly.
2. Pull up length of the kelly.
3. Ream ahead length of the kelly.
4. Pull up length of the kelly to add single or double.
5. Put kelly in rathole.
6. Pick up single or double.
7. Lower drill stem in hole.
8. Pick up kelly.

Symbols used are defined thusly:

B = weight of drilling mud, in pounds per cubic foot.

C = weight of drill-collar assembly in mud, minus the weight of same length of drill pipe in mud, in pounds,
$= (L)(C_m) - (L)(W_m)$.

C_a = weight per foot of drill collar in air, in pounds.

C_m = effective weight per foot of drill-collar assembly in mud, in pounds,
$= (C_a)(1 - 0.002B)$.

D = depth of hole, in feet.

D_1 = depth where drilling started after going in, in feet.

D_{1c} = depth where coring started, in feet.

D_2 = depth where drilling stopped before coming out, in feet.

D_{2c} = depth where coring stopped, in feet.

E = length of drill-pipe stand, in feet.

L = length of drill-collar assembly, in feet.

M = total weight of blocks, hook, links, and elevator, in pounds.

N = number of stands of drill pipe.

W_a = weight per foot of drill pipe in air, in pounds.

W_m = effective weight per foot of drill pipe in mud, in pounds,
$= W_a(1 - 0.002B)$.

T_m = ton-miles (weight in tons times distance moved, in miles).

Ton-Miles for Round-Trip Operations

The following equation[1] gives the amount of work in ton-miles required in making a round trip from a given depth D:

$$T_m = D(E + D)(K_1) + D(K_2) \quad (1)$$

wherein:

$K_1 = 0.0000000946\ W_m$.

$K_2 = (0.000000379)(M + 0.5C)$.

Values from T_m may be derived from the ton-mile chart, Fig. 1.

Ton-mile chart . . . The alignment chart, Fig. 1, was constructed from Equation 1. This chart is divided into two parts: Chart A applying to wells of less than 6,000-ft. depth, and Chart B applying to wells between 6,000 and 20,000-ft. depths. The ton-miles per round trip may be determined if depth, effective weight of pipe, and factor $M + 0.5C$ is known.

Use of ton-mile chart . . . To properly use the alignment chart (Fig. 1), it is necessary that the effective weight of the drill pipe, tubing, and drill collars in the drilling fluid be known. This can be approximated from Fig. 2, showing the effective weights plotted against the weight of drilling fluid, with guide lines pertaining to nominal weights and sizes of tubing, drill pipe, and drill collars.

Ton-Miles for Drilling Operations

The relationship between round-trip ton-miles and drilling ton-miles is expressed by the following equation:

$$T_{md} = 3(T_{m2} - T_{m1}) \quad (2)$$

wherein:

T_{md} = ton-miles drilling.

T_{m1} = ton-miles for one round trip at depth D_1.
$= D_1(E + D_1)(K_1) + (D_1)(K_2)$

T_{m2} = ton-miles for one round trip at depth D_2.
$= D_2(E + D_2)(K_1) + (D_2)(K_2)$

This simple relationship may be inferred by studying the "Cycle of Operations in Drilling." For any one hole, the sum of all Operations 1 and 2 is equal to one round trip; the sum of all Operations 3 and 4 is equal to another round trip; the sum of all Operations 7 is one-half a round trip; and the sum of all Operations 5, 6, and 8 may, and in this case does, equal another one-half round trip, thereby making the work of drilling the hole equivalent to three round trips to bottom. This relationship allows the ton-miles for drilling to be computed easily by the ton-mile chart, Fig. 1.

Ton-Miles for Coring Operations

Under unusual conditions, when a large amount of coring is done, the added work can be covered by taking two times the difference in ton-miles per round trip at the finish point of

[1] Material taken from Division of Production, American Petroleum Institute, publication A.P.I. RP-9B, second edition: Recommended Practice Application, Care, and Use of Wire Rope for Oil-Field Service.

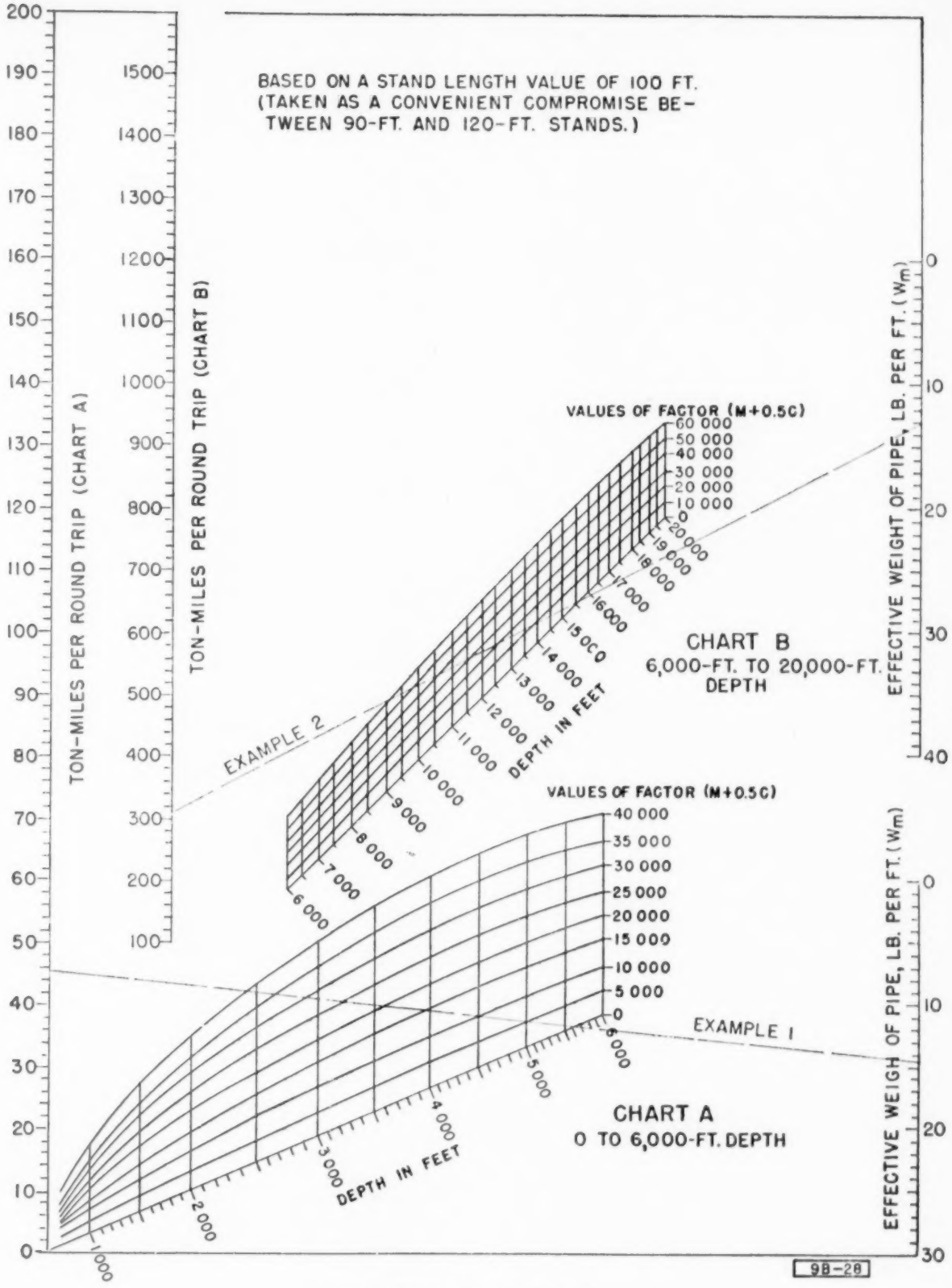


Fig. 1—Rotary drilling ton-mile charts.

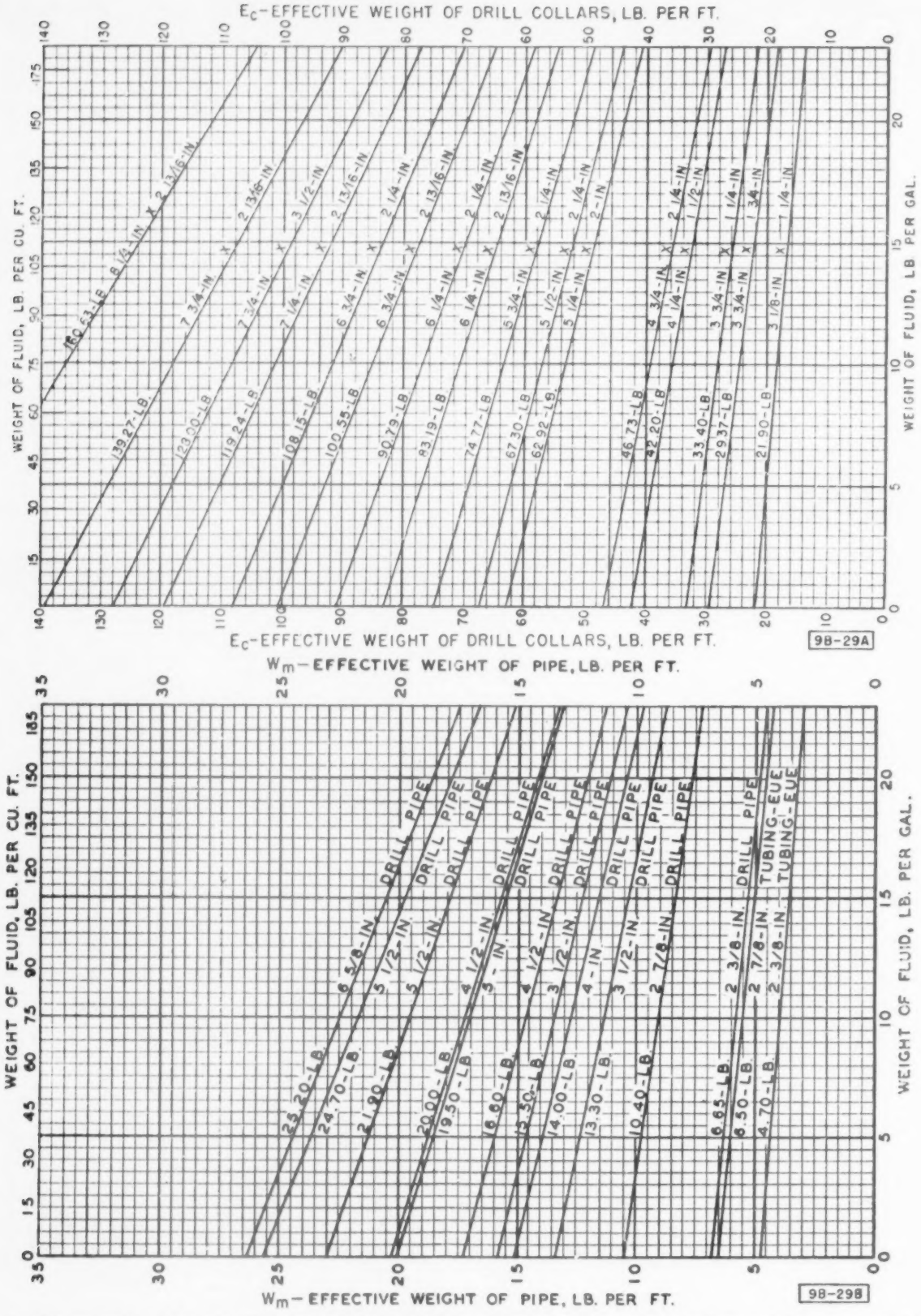

E_c-EFFECTIVE WEIGHT OF DRILL COLLARS, LB. PER FT.
WEIGHT OF FLUID, LB PER CU. FT.
WEIGHT OF FLUID, LB PER GAL.
E_c-EFFECTIVE WEIGHT OF DRILL COLLARS, LB. PER FT.
98-29A
W_m-EFFECTIVE WEIGHT OF PIPE, LB. PER FT.
WEIGHT OF FLUID, LB. PER CU. FT.
WEIGHT OF FLUID, LB. PER GAL.
W_m-EFFECTIVE WEIGHT OF PIPE, LB. PER FT.
98-29B

Fig. 2—Effective weight of drill pipe, tubing, and drill collars in drilling mud, based on Range 2 (29 ft.) drill pipe including average tool joint.

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ROTARY-LINE SERVICE RECORD

Sheet No._____

COMPANY_____ RIG NO._____

LINE: MAKE_____ INITIAL LENGTH_____

SIZE AND CONSTRUCTION_____ INSTALLATION DATE_____

MOVING AND CUTTING PROGRAM:
TON-MILES BETWEEN MOVES_____ LENGTH OF MOVE_____ FT.

TON-MILES BETWEEN CUTS_____ LENGTH OF CUT-OFF_____ FT.

RIG DATA

Make and Model_____
Drum: Diam._____ Length_____
Grooved or plain_____
Crown-block sheave diam._____ Groove_____
Traveling-block sheave diam._____ Groove_____
Weight, traveling-block assembly_____
Derrick height_____
Number of lines strung_____
String-up length_____
Drill-pipe size and weight_____
Length of stand_____

DATE	WELL	DEPTH, FT.	TYPE OF SERVICE[1]	TON-MILES[2]	TON-MILES SINCE MOVE OR CUT	WEIGHT OF DRILL-COLLARS, LB.	MOVES OR CUTS AND REMARKS (Record whether move or cut, amount, and condition; unusual wear or damage to line; and lubrication of line.)

[1]Indicate whether round trip (RT); drilling (D); running casing (CSG); or coring (COR).

[2]For round-trip operations, obtain ton-miles from API RP 9B or ton-mile slide rule. For drilling, setting casing, and coring operations, calculate the ton-miles from the following formulas.

Ton-miles drilling = 2 (ton-miles for one round trip at finish, less ton-miles for one round trip at beginning).
Ton-miles setting casing = ½ (ton-miles per round trip for corresponding weight drill pipe).
Ton-miles coring = 2 (ton-miles for one round trip at finish, less ton-miles for one round trip at beginning).

Fig. 3—Facsimile of rotary drilling-line service-record form.

coring and ton-miles per round trip at the beginning of the coring, as follows:

$$T_{mc} = 2\,(T_{m4} - T_{m3}) \qquad (3)$$

wherein:

T_{mc} = ton-miles coring.

T_{m3} = ton-miles drilling for one round trip at depth D_{1c}.

$$= D_{1c}\,(E + D_{1c})\,(K_2) + (D_{1c})\,(K_2)$$

T_{m4} = ton-miles drilling for one round trip at depth D_{2c}.

$$= D_{2c}\,(E + D_{1c})\,(K_1) + (D_{2c})\,(K_2)$$

The terms T_{m4} and T_{m3} may be evaluated from Fig. 1.

Total ton-miles . . . The grand total of ton-miles work will be the sum of the ton-miles for all round-trip operations (Equation 1); the ton-miles for drilling (Equation 2); the ton-miles for coring (Equation 3); and the ton-miles for setting casing which may be determined by taking one-half the ton-miles for one round trip of an equivalent weight of drill pipe.

Service record form . . . An approved form for recording rotary drilling-line service is shown in Fig. 3.

Examples

The following examples illustrate the method of using the charts shown in Figs. 1 and 2 in determining ton-miles per round trip.

Example 1—Given conditions:

1. Drill pipe: 4½-in. 16.6 lb. per ft.
2. Depth: 4,000 ft.
3. Drill collars: 200 ft. 5½-in. 67.3 lb. per ft.
4. M = 10,720 lb.
5. Drilling mud: 10.5 lb. per gal.

Solution:

1. From Fig. 2 find:

(a) Effective weight of 4½-in. 16.6-lb. per ft. drill pipe in 10.5-lb. per gal. mud to be 14.5 lb. per ft.

(b) Effective weight of 5½-in. 67.3-lb. per ft. drill collar in 10.5-lb. per gal. mud to be 56.8 lb. per ft.

2. Determine factor M + 0.5C as follows:

$$(M + 0.5C) = 10{,}720$$

$$+ 200/2\,(56.8 - 14.5) = 14{,}950$$

3. On Fig. 1 Chart A (0 to 6,000-ft. depth):

(a) Locate intersection of 4,000-ft. depth (vertical line), with M + 0.5C of 14,950 (curved line).

(b) Locate effective weight of drill pipe (14.5 lb. per ft.) on right vertical scale.

(c) Project line from 14.5 lb. per ft. on right vertical scale through point found in (a) above to ton-mile per round trip on left vertical scale and read 45.5 ton-miles per round trip.

Example 2—Given conditions:

1. Drill pipe: 3½-in. 15.5 lb. per ft.
2. Depth: 11,000 ft.
3. Drill collars: 500 ft. 5½-in. 67.3 lb. per ft.
4. M = 24,450 lb.
5. Drilling mud: 12.2 lb. per gal.

Solution:

1. From Fig. 2 find:

(a) Effective weight of 3½-in. 15.5-lb. per ft. drill pipe in 12.2-lb. per gal. mud to be 13 lb. per ft.

(b) Effective weight of 5½-in. 67.3-lb. per ft. drill collar in 12.2-lb. per gal. mud to be 55 lb. per ft.

2. Determine factor M + 0.5C as follows:

$$(M + 0.5C) = 24{,}450$$

$$+ 500/2\,(55 - 13) = 34{,}950$$

3. On Fig. 1, Chart B (6,000 to 20,000-ft. depth):

(a) Locate intersection of 11,000-ft. depth (vertical line), with M + 0.5C of 34,950 (curved line).

(b) Locate effective weight of drill pipe (13 lb. per ft.) on right vertical scale.

(c) Project line from 13 lb. per ft. on right vertical scale through point found in (a) above to ton-mile per round trip on indicated vertical scale and read 310 ton-miles per round trip.

Reference

1. See A.P.I. Bulletin RP-9B for discussion of this equation.

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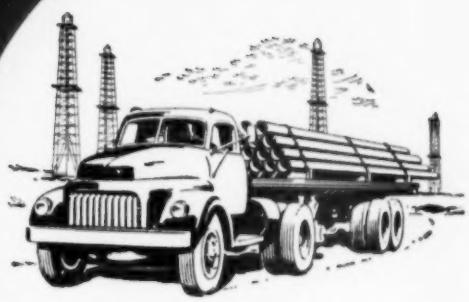

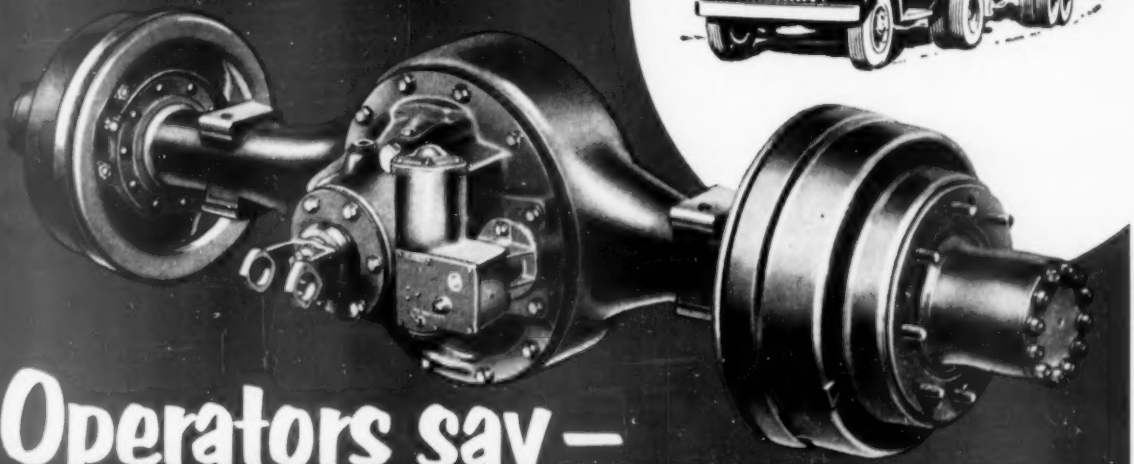

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PETROLEUM BENZENE . . . Platformer and Udex facilities at Eastern States Petroleum Co. Houston plant. The Udex unit, developed by Dow Chemical Co. and engineered and licensed by Universal Oil Products Co., can recover benzene, toluene, and xylenes. Alternatively, if the benzene market is soft, the Platformer can be used for fuels production.

PETROCHEM REPORT:

WHAT ABOUT AROMATICS DEMAND?

by L. A. Schlueter

BENZENE, one of the prime building blocks of the organic-chemical industry, has been growing by leaps and bounds since the beginning of World War II. Since benzene is so basic, its requirements are largely governed by the production of the products using it as a raw material. Therefore, anything that affects the production of styrene, phenol, aniline, and other intermediates as well as finished products such as plastics, DDT, etc., have a direct effect on the market for benzene.

Benzene Demand

The N.P.A. established goals for most of these intermediates and finished products and based on these requirements a benzene goal of 375,000,000 gal. production per year by 1955 was established. It is expected that the capacity to produce will approach this figure by that time and it is also expected that the capacity to consume benzene will also approach this figure by 1955. However, with the lengthening out and some cutback in military requirements, plus the effect of the current economic trends, it appears that we will have some excess capacity by 1955. It may take several years for demand to catch up with productive capacity. This is a penalty we pay for preparedness.

The coal chemicals committee of the American Coke and Chemicals Institute at a recent meeting set up its estimates of benzene requirements for 1953 and 1954. It is the feeling of this committee that the benzene requirement for these 2 years will be in the neighborhood of 250,000,000 gal. for each year, with the benzene requirement for styrene remaining at 92,000,000 gal. for each year and phenol requirement increasing from 52,000,000 gal. in 1953 to 58,000,000 in 1954. A slight increase is expected in aniline, maleic anhydride, and synthetic detergents, with the other benzene requirements remaining about the same for both years.

Styrene . . . This is remaining the same in 1954 as 1953 despite the growing demand for plastics as it is felt that the

Presented at annual meeting of American Coke and Chemicals Institute, White Sulphur Springs, W. Va., October 13, 1953.

Coke men told . . .

- There will be excess benzene capacity by 1955.
- But there will be no dumping of petroleum benzene—catalytic reformers can be turned to high-octane gasoline production.
- Over 70 per cent of toluene goes to T.N.T. and aviation gasoline.
- Xylene is a competitive material which is becoming increasingly important.
- Tricresyl phosphate finding new uses.

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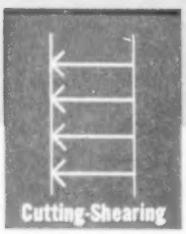

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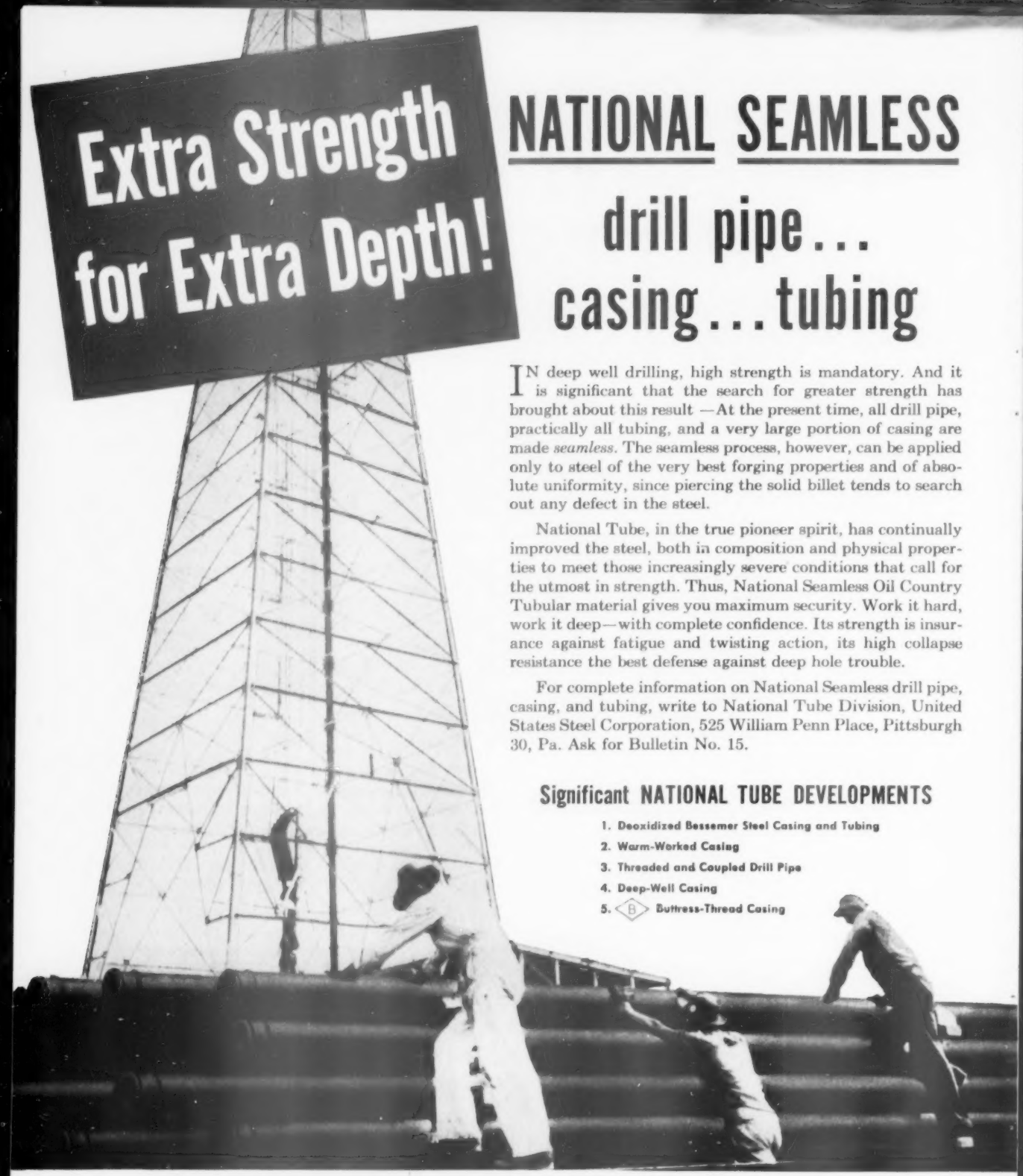

NATIONAL SEAMLESS

drill pipe... casing... tubing

IN deep well drilling, high strength is mandatory. And it is significant that the search for greater strength has brought about this result —At the present time, all drill pipe, practically all tubing, and a very large portion of casing are made *seamless*. The seamless process, however, can be applied only to steel of the very best forging properties and of absolute uniformity, since piercing the solid billet tends to search out any defect in the steel.

National Tube, in the true pioneer spirit, has continually improved the steel, both in composition and physical properties to meet those increasingly severe conditions that call for the utmost in strength. Thus, National Seamless Oil Country Tubular material gives you maximum security. Work it hard, work it deep—with complete confidence. Its strength is insurance against fatigue and twisting action, its high collapse resistance the best defense against deep hole trouble.

For complete information on National Seamless drill pipe, casing, and tubing, write to National Tube Division, United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa. Ask for Bulletin No. 15.

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NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

NATIONAL SEAMLESS WALLS WITHOUT WELDS *drill pipe...casing...tubing*

USS

UNITED STATES STEEL

cutback in the synthetic-rubber program will just about offset any increase in plastic and other nonrubber uses of styrene.

Phenol . . . A small increase is expected because of the growth factor in plastics and some fast-growing new plastic applications such as resin requirements for shell molding for foundries which saves considerable machining on cast parts and has been of particular interest and a money saver for the automobile and other industries. Some plastic people have high hopes for this use and predict ultimate volume that could require 40 to 50 million gallons of benzene per year to supply the necessary phenol. The current benzene goal reflects around a 10,000,000-gal. benzene requirement for this and wood-waste utilization by 1955.

Polyester plastics . . . Another plastic development that can affect benzene requirements through two products is the polyester glass-reinforced plastic. This is finding use in light-weight pipe, paneling, bath tubs, boats, some special auto bodies, and one truck-trailer manufacturer is now experimenting with it. There are many fabrication problems still to be worked out before the uses for these plastics become widespread and competitive. But the ingenious plastic industry has a habit of solving these problems sooner or later.

> "We are going to have to keep our eyes open as the petroleum industry is playing in our back yard more and more, and when they are at bat they take a hard swing at the ball and may break some of our windows."

About one-third of the weight of the finished plastic requires products produced from benzene. These are just two examples of relatively new products that have very little history on which to project future demands that have a great bearing on future benzene requirements. Since at least 60 per cent of the benzene consumption is for phenol and styrene which are used mostly for plastics, you can see that benzene requirements are very definitely affected by plastic developments whether they be on the plus side as new uses for the phenolic and styrenes or on the minus side as is the case when some new plastic not built of coal chemicals is developed which can usurp some uses now enjoyed by phenol or styrene-based resins.

Excess benzene . . . A comparison has been made based on the construction schedules which showed that the consuming capacity and the producing capacity for benzene was running about even. This still holds true but not all the installed capacity to use or produce benzene is operating at full capacity at the moment and probably will not next year unless there is an unforeseen spurt in demand. It appears most persons are not that optimistic at the moment. However, to counterbalance this condition, about 20 to 25 million gallons of benzene-producing capacity is currently converted to toluene production which leaves benzene in a much healthier supply-requirement position.

Because of defense-accelerated expansions we may expect excess benzene producing capacity for a year or two, but a basic product like benzene with the growth pattern of from 40,000,000 gal. in 1940 to over 200,000,000 gal. in 1950 and now around 250,000,000 gal., will continue to grow, and before too many years will require additional capacity.

No benzene dumping . . . In the meantime the coke-oven industry should continue to move its entire production and the remainder will be supplied by the petroleum industry with imports dwindling to a mere trickle. Along this same line, it appears that if there is not a full demand for the petroleum benzene, the equipment will not remain idle. In a paper dated March 24-26, 1953, presented by Dr. Gustav Egloff, of Universal Oil Products Co., it was stated: "About 30 refineries are now either producing or installing facilities for aromatics. Benzene, toluene, and xylene are produced by the Universal Oil Products Platforming or other catalytic reforming processes which can also be used for producing high-octane gasoline and thus offer the refiner versatility in the event the demands change."

If this is universally true and with the growing demand for high octane, I do not believe the petroleum producer will offer any benzene at "dumping" prices.

Toluene and Xylenes

As is always the case during a national emergency, toluene is in the greatest demand as compared to supply because of demands for T.N.T. production and aviation-gasoline enrichment. As most of you are well aware, over 70 per cent of the current toluene production is being earmarked for those two uses with no relief in

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sight until additional capacity is completed which is expected by the end of the year. The current condition has been further aggrevated by one large source being temporarily out of production. We had hoped that after hostilities had ceased in Korea, the toluene situation would ease. However, that apparently is not yet the case.

Toluene could go down . . . For the long pull the picture could be pessimistic for toluene for several reasons. First, the 1955 Defense Production Administration goal for toluene is 180,000,000 gal. or almost three times the annual production prior to Korea. In the interest of national defense, this goal is necessary and held to this low figure only because when and if necessary additional aromatics could be recovered from petroleum streams in about the same period of time required to reactivate consuming equipment.

However, if the defense load were completely dropped, there would be a large excess of productive capacity for the normal toluene uses, even if some of the petroleum capacities were, as some owners have stated could be, converted to other uses. Of course, after World War II we had considerably more available capacity and a large stockpile which hurt the market but it did recover after a period of several adjustment years.

Xylene competitive . . . However, this time there is a new factor involved as a competitive product, xylene. As many of you know, Dacron, a synthetic fiber, requires terephthalic acid produced from p-xylene. To extract p-xylene it is necessary to start with a good refined grade of mixed xylenes and after part of the para is extracted the remaining product is suitable for solvent or other purposes. At present only petroleum xylene is being used as the quantities of coke oven xylene available at any one source do not warrant the equipment outlay necessary. It appears that this residual xylene will be available in quantities at least double the quantity of xylol produced heretofore. The only use for this material in the near future other than for solvents would be for blending in motor fuel which immediately places it in a lower value group. This could well affect the value and demand for toluene for solvent purposes as well.

Isophthalic acid . . . For the long-range effect this large availability of xylenes could make for lower cost o-xylene and affect the naphthalene market. There could be a further effect from the production of isophthalic acid from the meta isomer left over. The latter would

(Continued on page 109)

How to Predict

Natural-Gasoline Content

. . . of produced fluids from field separation data

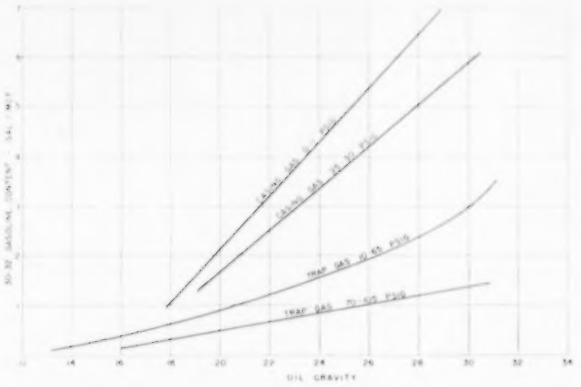

Fig. 1—Comparison of curves for different separation conditions.

Several hundred wells in the Long Beach Harbor area of Wilmington field in California have had their separation changed in the past several years from trap separation at 30 to 100 psig. to casing-gas separation at 0 to 30 psig. These wells represent wide variations of gravities, gasoline contents, gas-oil ratio, productivity index, production and reservoir depletion. The large amount of data accumulated in this connection has been correlated to make possible estimation of natural-gasoline liquids production. The broad limits covered by the data on which this correlation is based may make the findings of value for predictions in other areas.

by Samuel G. Miller

THE petroleum or gas engineer is occasionally called upon to answer such questions as what oil, gas, and natural-gasoline production may reasonably be expected at a particular separation pressure, what increased revenue such production can be expected to result in to the oil-field operator, and whether new gasoline-plant and pipe-line construction or additions are economically justified.

In answering these questions over the past several years in the Long Beach Harbor area of Wilmington field, a background of information and experience has accumulated which may be of value to engineers concerned with other oil-field areas. During this period several hundred oil wells have had their operation changed from trap separation at 30 to 100 psig. to casing-gas separation at atmospheric to 30 psig. These wells have represented an unusually wide range of operating conditions including oil gravities from 13° to 33° A.P.I. gasoline contents from practically nil to upwards of 7 gal. per 1,000 cu. ft., productivity indexes ranging from 0.1 to 7.0, oil production from 5 to 400 bbl. per day, producing gas-oil ratios from low figures up to 4,000 and varying states of reservoir depletion.

Making the Correlation

Fig. 1 presents a correlation, based on this accumulation of data, from which 30-32 grade natural-gasoline content can be estimated according to the oil gravity and the pressure at which separation is carried out.

In Figs. 2 to 5, actual field data are plotted for the gasoline content of natural gas for different oil gravities and separation pressures. Average lines taken from these figures form the basis for Fig. 1. The information is directly useful for gasoline liquids production forecasting. It will be noted that the measure of gasoline content is the C.N.G.A. 30-32 charcoal absorption test, which approximates the butanes plus liquid content of gas. This test is also a fair approximation of the liquids extraction obtained in low-pressure natural-gasoline absorption plants such as are encountered in the Los Angeles basin.

Trap separation . . . Figs 2 and 3 give actual field measurements on the gasoline content of field gases in equilibrium with a wide range of oil gravities at 70 to 105-psig. trap pressure, and at 10 to 65-psig. trap pressure, respectively. Closer correlation as to pressure was not possible because observations made at 10 to 15-psig. trap separation, for example, were to be found both above and below the averaged 10 to 65-psig. line drawn in Fig. 3. It will be noted that observations from six other California oil fields fall in with the Wilmington data. These six fields are located in the Los Angeles, Coastal, and San Joaquin basins.

Casing-gas separation . . . Figs. 4 and 5 represent similar data for casing-gas separation, at 25 to 30 psig. and 0 to 1 psig., respectively. In Fig. 5, data from another Los Angeles basin field appears to correlate with the Wilmington data.

Applying the Correlation

There is a marked scattering of the data which is to be expected from field observations, but there is sufficient delineation to draw the average lines indicated for the several separation conditions. Some of this variation may also be attributed to the wide range of oil productions and gas-oil ratios represented. The variation due to these factors, however, while no doubt of consequence, apparently does not introduce enough effect to prevent correlation. This may, perhaps, be expected from the common knowledge of oil-well behavior that oil gravity and the properties of gas in equilibrium with the oil remain remarkably constant over the life of a well, despite changing production and gas-oil ratio.

Not applicable over 30° A.P.I. . . . These correlations break down at oil gravities appreciably greater than 30° A.P.I. because higher gravities yield appreciable percentages of stock-tank gas which contain large quantities of gasoline. For example, data from a well-known Los Angeles basin field where oil gravities are about 34° A.P.I., showed much lower contents than would be expected from the extrapolated curve of Fig. 5. Below 30° A.P.I. the amounts of stock-tank gas

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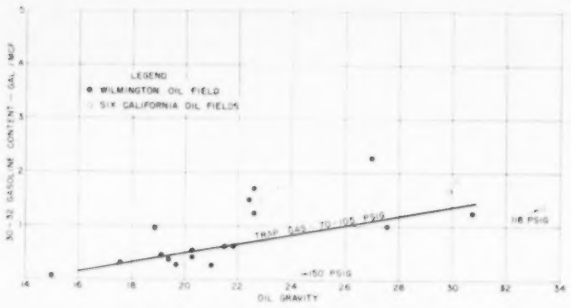

Fig. 2—Trap separation, 70-105 psig.

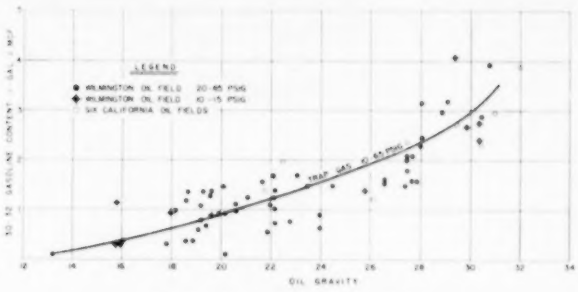

Fig. 3—Trap separation, 10-65 psig.

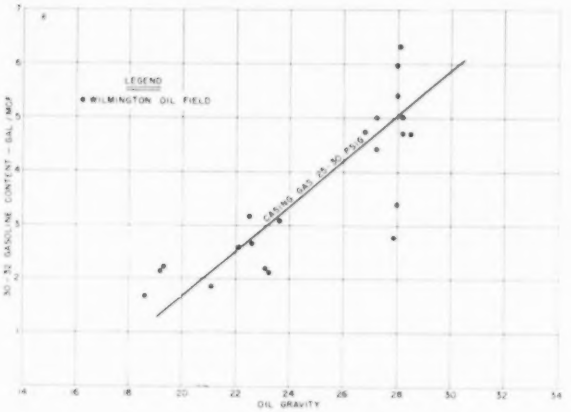

Fig. 4—Casing separation, 25-30 psig.

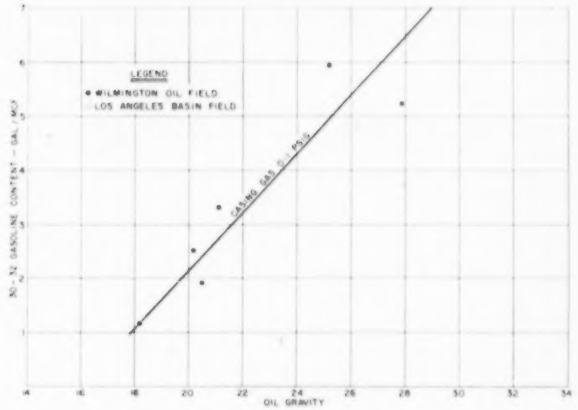

Fig. 5—Casing separation, 0-1 psig.

represent only several per cent of the total gas produced, and such proportions do not affect the general utility of the correlation.

At the lower end of the scale, information from one heavy-oil field in California indicated gasoline contents as expected: 0.05 gal. per 1,000 cu. ft. gasoline content from a 55-psig. trap producing 11.8° A.P.I. oil. But that from a second heavy-oil field indicated 2.1 to 2.6 gal. gasoline for 11.5° A.P.I. oil from about the same trap pressure. This latter figure is completely out of line both with Wilmington data and with the other heavy-oil field. The only explanation suggested is that the use of heat in the production operation at this particular field may contribute to the rather high gasoline content. Parenthetically the same field also produces 22° A.P.I. oil with an equilibrium gas which does correlate with Wilmington.

Nature of equilibrium . . . The fundamental difference between the nature of equilibrium in trap separation as compared with casing-gas separation is brought out in a comparison of Figs. 3 and 4, in which trap separations at 10 to 15-psi. pressure can be expected, apparently, to produce a leaner gas than casing separation at the higher pressure of 25 to 30 psig. It appears that reestablishing equilibrium at the trap in the case of trap separation results in a certain amount of reabsorption of gasoline components by the crude oil. And it may be presumed that casing gas is richer than trap gas because it evolved from the crude at a higher temperature.

This is of significance in the case where a choice is to be made between casing and trap separation in the lower pressure region. If higher income is obtained by including the gasoline in the oil, trap separation would appear the economic choice. The increased income must be balanced, however, against the installations frequently necessary when operating traps at lower pressure, namely pumping equipment or trap elevation to secure flow of oil into the tank farm, in lieu of trap pressure.

When gas is taken from the casing, there is either sufficient solution gas evolved to maintain the former trap pressure, or else a small quantity of gas may be bled into the trap from some nearby source of pressure; so that these changes are usually not required in converting to casing separation. It is sometimes necessary to provide a separate low-pressure piping system for casing gas, but this is usually the obligation of the gasoline-plant operator, rather than the producer.

Gasoline-plant economics . . . The gasoline-plant operator's economics may be quite different from those of the oil producer. He does not share in oil income and he may not only be operating on the lean end of gasoline royalty distribution, but must also pay his operating costs out of his gross income. He may therefore not be as eager to install the equipment for lowering casing pressure as is the oil producer. In one typical case, the payout on the oil producer's share of the investment was measured in days, while the gasoline-plant operator's payout was several years.

The gasoline-plant operator's economics are especially poor in the case

THE AUTHOR

Samuel G. Miller is principal gas engineer with the Long Beach Harbor Commission where he is concerned with gas and gasoline production in the Harbor department's extensive tideland oil properties. He graduated in chemical engineering from Johns Hopkins University in 1940. He was pilot-plant foreman and later process engineer in the Bureau of Mines. He spent several years in process work in the construction business in Los Angeles, lastly with Bechtel Co. as project engineer. He has been with his present connection for the past 4 years.

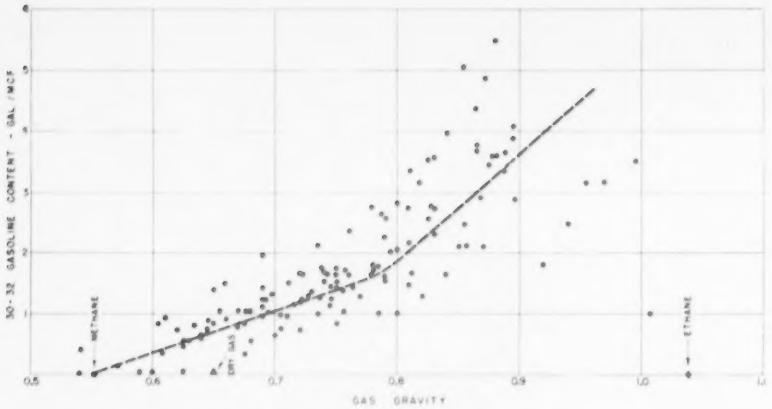

Fig. 6—Gas gravity vs. gasoline content

of the lean gases obtained at low oil gravities and high separation pressures, as plant size and operating cost are about the same for both lean and rich gases. Hence, it has been found uneconomical to extract gasoline from gases with less than ¼ to ½ gal. per 1,000 cu. ft. of liquid content. Frequently such gases are delivered directly into the fuel-gas system after field scrubbing.

Fig. 6 supplements the information given above in correlating the butanes-plus gasoline content of gas against gas gravity. Here again there is a scatter of data, but the average line drawn is useful for many purposes. Sometimes only a gas gravity is available from which to make a rough estimate of gasoline production, and Fig. 6 may be used in conjunction with the other correlations in these cases.

It is interesting in this connection to observe that separator gases in equilibrium with low gravity oil (11° to 15° A.P.I.) sometimes contain practically no gasoline, and furthermore may consist of practically pure methane. At Wilmington these field gases may be actually of lower gravity than the gas produced from the local absorption plants which release a dry gas consisting of around 0.04 gal. per 1,000 cu. ft. of gasoline, with some ethane. This observation has apparently been made for low-gravity oil in another California field. For convenience in this comparison the gravities of methane, ethane, and dry gas are indicated in Fig. 6.

Predicting Gasoline Production

In using the correlations to predict new gasoline production for a group of wells at lowered casing pressure, one estimates the increased oil production from the best productivity index data available, then applies a gas-oil ratio to the new daily oil production arrived at. The best estimate of gasoline content based on Figs. 2 to 5 and the average oil gravity of the wells concerned is applied to the daily gas-production figure. It is necessary to check that each well included is operating at capacity; wells with fluid levels or beaned back for water, sand, or gas control will not show increases in production.

Gas-oil ratio . . . The question of what gas-oil ratio is to be used in computing gasoline production at lowered casing pressures deserves some discussion. It was found, in the case of wells on which casing pressure was lowered with substantial increases in production resulting, that two types of behavior were exhibited: the wells either remained practically constant in gas-oil ratio, or else increased markedly. Upon further examination it was determined that the wells in which the gas-oil ratio had increased so much were nearer a low-pressure area in the reservoir.

The gas which was produced over and above the gas-oil ratio upon lowered pressure was thus presumed to be gas which otherwise would have migrated to the low-pressure area to be produced by wells there. A check of these neighboring offsetting wells showed definite drops in gas production upon lowering of casing pressures of the wells studied, confirming this conclusion.

In any case, it is considered to be a conservative approach to assume an unchanged gas-oil ratio at the lowered casing pressure.

Remember decline rate . . . An additional factor, which is sometimes overlooked in payout calculations, is the decline rate. If the wells involved have substantial productivity indexes, and represent a large proportion of pool production, withdrawal of fluids from these wells may increase the pool decline rate sufficiently to show declin-

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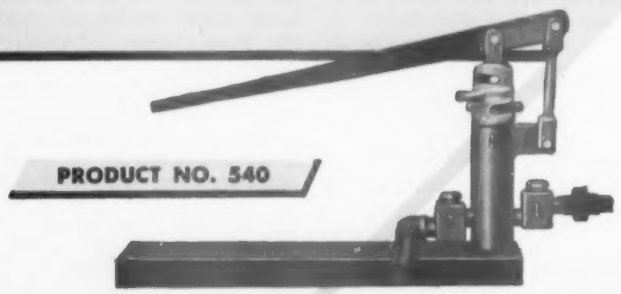

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ing income from both oil and gasoline during the period in which an installation is paying itself out.

For cases where offsetting conditions are determining, it is of course necessary to maintain casing pressures which are at parity with those on offset locations. It is only common sense in these situations to avoid competition in the lowering of pressures. Compressor installations in the low-pressure range involve high compression ratios and are costly to install and operate. Oil-production increases are correspondingly much smaller.

It is much more desirable to have all the parties be accorded the same treatment as to casing pressure by the gasoline plant and to patiently await the day of lowered pressure at such time as the lower field production has made horsepower available for operation under vacuum conditions.

Field information only . . . In this paper the writer has reported field information only. No attempt has been made to compute theoretical flash curves to compare these field results with. These it is considered have limited value because they are applicable to trap separation only; the data for casing-gas separation which is a more complicated process, perhaps analogous to distillation, is not subject to such calculation.

The larger number of wells and the wide range in operating conditions represented in the correlations are such that they have proved valuable in Wilmington field operations, and it may be expected that they will find application elsewhere.

Acknowledgment

The writer acknowledges with thanks the help of William Wright, of General Petroleum Corp., who supplied data on other California oil fields, and also the Long Beach Harbor Department, which permitted this information to be published.

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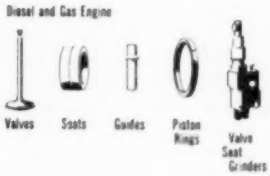

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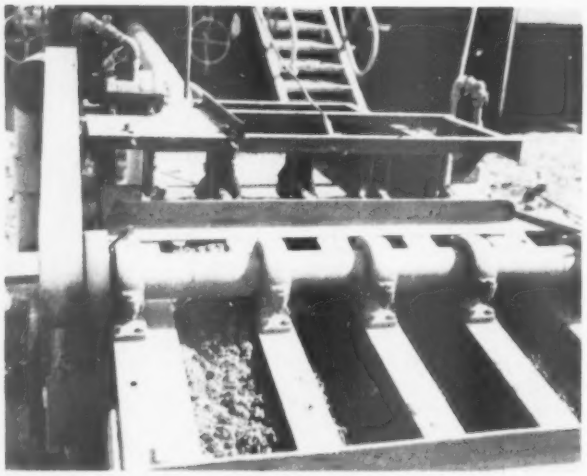
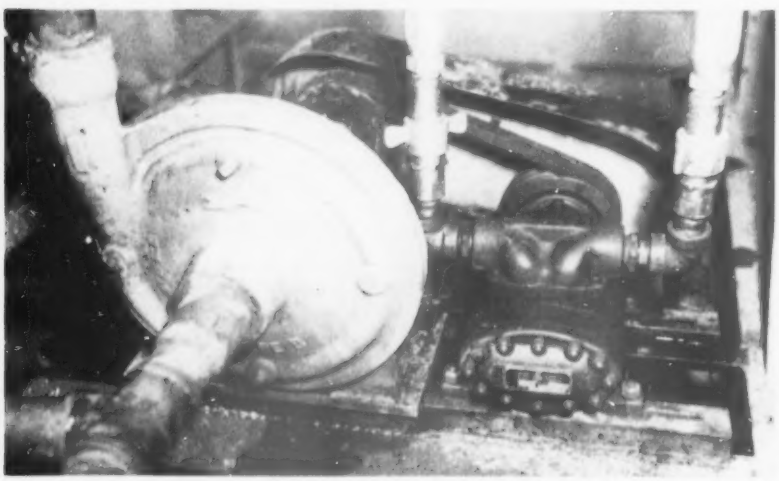
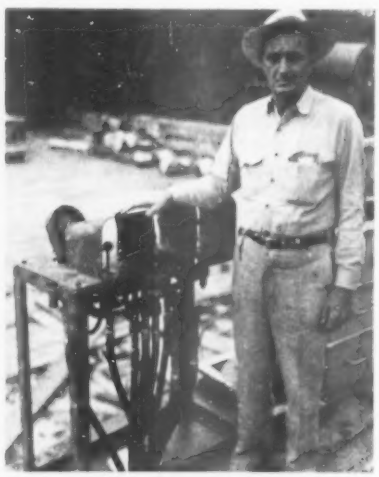
The fluid pump on the right and the volume tank on the left have been mounted in an often-wasted space on this Herman Graham Drilling Co. rig operating near Ardmore, Okla.



Shale shaker equipped with hydraulic motor. Fluid motor size is much less than other drives with comparable power rating. Photos courtesy Fluid Power Corp., Oklahoma City.



Its compactness and flexible connections permit the installation of the fluid motor in cramped quarters, as in this under-the-floor water-pump installation.



Centralized controls allow operation of auxiliaries from this panel on the floor.

Fluid Power More Flexible For Driving Rig Auxiliaries

by Ed McGhee
District Editor, Drilling and Production

THE need for an absolutely spark-proof drive for the shale shaker makes the application of hydraulic motors to rig auxiliaries particularly attractive. However, the fluid power units offer other advantages in ease of control, compactness, sturdiness, and general flexibility that will give them a wider future usage on drilling rigs.

In many instances, a hydraulic system receiving motivation from the drilling engines will eliminate the necessity for daylight operation of the light plant, thereby effecting a considerable saving.

Usual applications on drilling rigs are to drive the water pump, shale shaker, wire-line reel, and blowout preventers. When these auxiliaries are hydraulicly driven, the driller may be sure that if his shale shaker is operating, the pressure is sufficient to close the blowout preventers should the need arise.

Compactness . . . Because of its small size, the pump providing pressure to the hydraulic system may be placed near the prime mover to receive the input power. Then, the output fluid travels through high-pressure rubber hose to the various motors that may operate simultaneously from the single pump.

Fig. 1 is a cross-section of a new positive rotating unit that may be used as either a pump or as a motor. Several of these elements are "stacked together in parallel in a single housing if it is desired to obtain greater power rating than one element provides.

In the type illustrated the rotating elements are geared together so that they are always in proper relation. The rolling contact causes little friction or

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Marvel Synclinal Filters are installed on this drilling rig by the manufacturer. Emsco Derrick and Equipment Company. Marvel Synclinal Filters keep the lubrication system free from foreign matter. Insert circle shows line model installation.
(Photo Courtesy of Emsco Derrick and Equipment Company)

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American Iron Square Kellys are also made from a heat treated one piece alloy steel forging with top and bottom integral upset ends formed during the forging operation. The radius on the square of the driving surface is correctly formed during the forging operation. Correct forging processes plus straightness, joint alignment, concentricity of bore, hardness and precision threaded connections, make the American Iron Square Kelly the best balanced square kelly available.

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wear; moreover, all moving parts are lubricated by the power fluid. Wear is further reduced by the lack of inlet or outlet valves.

Fluid displacement of a positive pump is directly proportional to the speed at which it is driven; therefore, input power is governed by the pressure at which the system operates. Power output of the motors depends on the volume and pressure of the fluid it receives. Efficiency is high over the entire wide range of operating speeds, so that there is no appreciable fluid heating.

No harm from stalling . . . Should the driven load stall a motor, no damage can result because back-pressure valves relieve the system so that a definite, controllable torque will be exerted and not exceeded even in the absence of rotation. In fact, the small rotative mass of the units allows almost instantaneous reversing.

Installing a central control panel for all motors is a simple matter of extending the hoses under the floor to a convenient place near the driller's position. From this panel the driller may stop or start the shale shaker, open or close any set of his blowout-preventer rams, stop or start a water pump, and operate the wire-line reel.

Importance of clean fluid . . . Clearances between the rotating parts themselves and between the rotating parts and the housing are small; consequently the power fluid must be maintained in a clean condition. Filters in the system trap any foreign matter that may enter. If the same care is given to the hydraulic fluid that is given to drilling engine lubricating oil, no premature failure need be expected as a result of contamination.

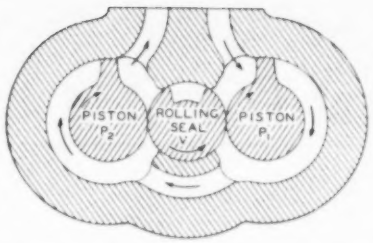

Fig. 1—Arrows indicate the path of travel of the power fluid through this hydraulic unit. The unit may be used interchangeably as a pump or as a motor.

A volume tank of 30-gal. capacity is sufficient for most rig applications.

When rigging down to move, the pressure hoses may be broken at self-sealing couplings, thereby eliminating spillage and contamination as well as the necessity of bleeding the lines to resume operations. On the other hand, connections during rigging up are made easily and with no concern for improper hookup that might result in motor damage.

Other applications . . . Many other applications of the fluid-power units have been made in other phases of the petroleum industry. One operator has installed a pump unit to receive power from the power takeoff on the tractor of a trailer gasoline tank; a motor mounted on the trailer drives the gasoline unloading pump. The fireproof character of hydraulic power is especially valuable here.

The high output torque of a stalled fluid motor has made the units readily applicable to pipe-wrapping machines. When placed to drive the enamel pump, the motors are not harmed by a line "freeze" and aid in clearing the line when the enamel is heated sufficiently to "thaw." The light weight of the units is beneficial since the machines must be supported by a side-boom tractor.

Several applications that offer promise are being tested in gasoline plants and refineries. One project would utilize waste power lost through the throttling of absorbing oil out of a gasoline plant's high-pressure absorbers. The power gained should be enough to operate the plant's cooling system.

PUMPS

TYPES • SELECTION • INSTALLATION • OPERATION • MAINTENANCE

by FRANK A. KRISTAL
Licensed Professional Engineer, and
F. A. ANNETT
Contributing Editor, *POWER*

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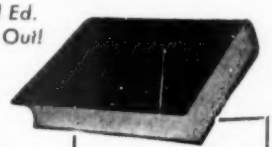

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SYMPOSIUM . . . Use of Wire-Mesh Sections in

Asphalt Entrainment Control in Vacuum Pipe Stills

Part 2

. . . Case History—Ohio Oil Co., Robinson, Ill.

by J. W. Russell

AT Ohio Oil Co.'s Robinson, Ill., refinery crude oil is prefractionated to produce approximately 40 per cent bottoms which is charged through a reduced crude heater operating at 775°-790° F. transfer temperature. The vapor-liquid mixture from the heater enters the 20-ft.-diameter vacuum tower tangentially. Penetration asphalt is withdrawn from the bottom of the tower without steam stripping and vapors are condensed within the tower with circulating gas-oil reflux. The vacuum gas-oil stream is pumped to an F.C.C. unit charge tank and the wax distillate is recycled back to the inlet of the reduced crude heater. (See Fig. 1 which also shows the location of the mist extractors.)

Original Installation

The mist extractor is supplied in approximately 13½-in.-wide sections precut to conform to the curvature of the tower. Initial installation, 2½ in. thick, was made below No. 6 tray in October 1949 and contained 36 sections.

Table 1 shows the effect of this mist extractor on the quality of the side streams when producing 80/90 and 102 softening-point asphalt as a vacuum-column bottoms product. Asphalt softening point is varied by changing the reduced-crude heater transfer temperature while holding the vacuum-tower pressure constant.

Modifications . . . In May 1950, the thickness of the mist extractor below No. 6 tray was increased to 5 in. and a 5-in.-thick, 18-section extractor was installed at the vacuum gas-oil drawoff pan. The wax-distillate drawoff rate was 1,000 bbl. per day before and 500 bbl. daily after the above revision was made, which accounts for the increase in Conradson carbon of that stream after the revision. Therefore, the data of Table 2 are not completely indicative of the effects of the revised mist extractor installation on the quality of the vacuum tower side streams.

Present Installation

Present vacuum-tower operating conditions and charge and side stream inspections are presented in Tables 3 and 4.

Fig. 2—Vacuum-tower internals and details of changed support for wire-mesh mat at Ohio Oil Co. refinery.

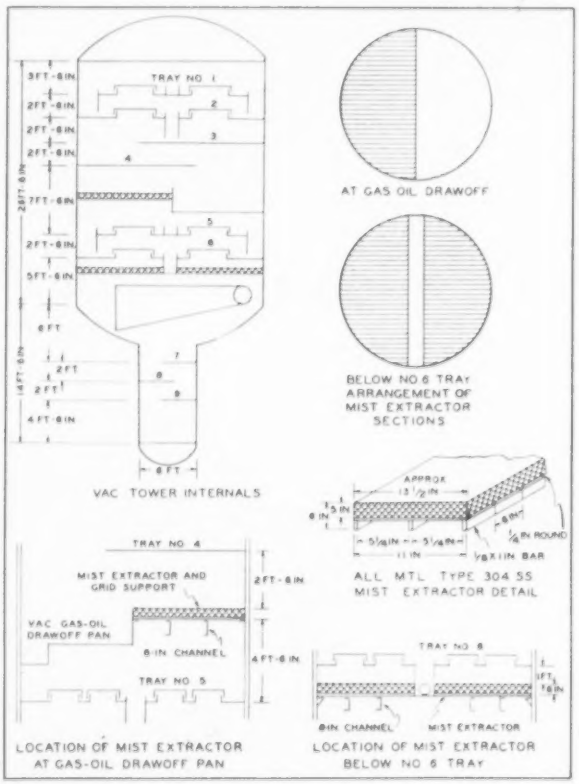
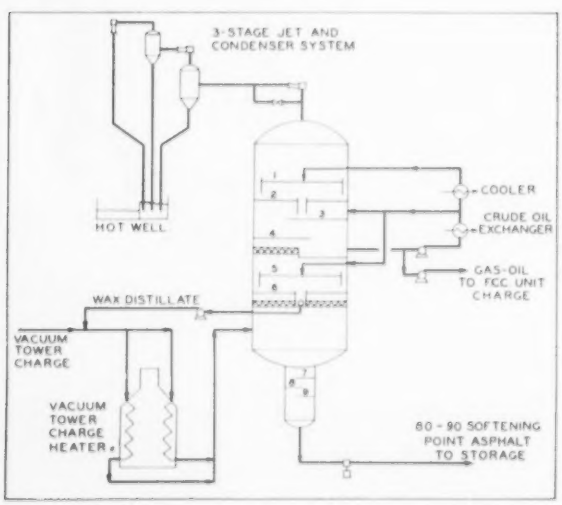


Fig. 1—Ohio Oil Co. vacuum operation at Robinson, Ill., showing location of mist extractors.



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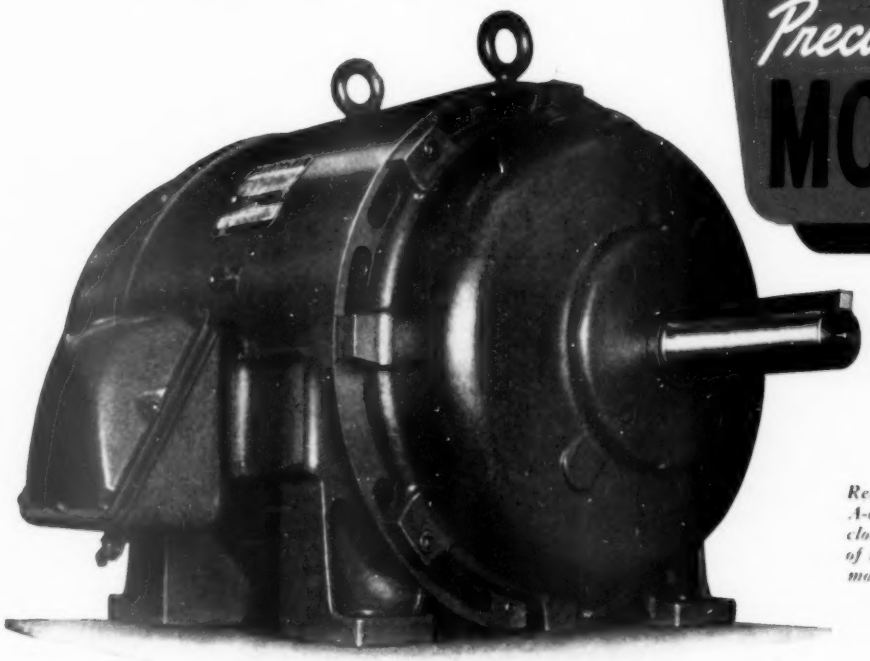

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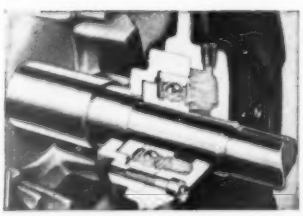

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Corrosion problem . . . The initial mist-extractor support was carbon steel, 4 lb. per sq. ft. expanded metal grating with a free area of approximately 75-80 per cent. Prior to April 1952, the vacuum tower was shut down at 6-month intervals due to the high corrosion rate and failure of the expanded-metal support below No. 6 tray which would allow at least one end of one or more mist-extractor sections to fall to the bottom of the tower. This failure resulted in an increase in Conradson carbon and color of the vacuum gas oil.

TABLE 4—PRESENT OPERATION—INSPECTIONS

	Crude	Reduced crude	Wax distillate	Vacuum gas oil	Vacuum Col. btms.
Gravity	36.2	20.6	22.3	24.9	12.0
Softening point					87.5
Color			5	2	
Penetration					
Conradson carbon		5.23	1.63	0.42	7.31
Distillation:					
I.b.p.	136	622	440	580	
10 per cent	238	660	674	662	
20 per cent	304	672	692	684	
30 per cent	384	682	700	692	
40 per cent	476	690	708	702	
50 per cent	562	694	716	706	
60 per cent	650		724	710	
70 per cent	686		736	720	
80 per cent	706		756	728	
90 per cent				734	
E.p.					

TABLE 1—EFFECT ON PRODUCT QUALITY

	80/90 S.P.		102 S.P.	
	Before	After	Before	After
Reduced crude rate, bbl. per day	8,000	8,000	8,000	8,000
Conradson carbon:				
Vacuum gas oil, weight per cent	0.70	0.57	0.79	0.68
Wax distillate, weight per cent	4.56	2.82	5.75	3.27

Changes made . . . In April 1952 the expanded metal below No. 6 tray was replaced with the type of support indicated in Fig. 2, fabricated from Type 304 stainless steel. The new support has a free area of 98 per cent. The original carbon steel 8-in. channels below No. 6 tray were also replaced at that time with Type 410 stainless-steel channels due to the high corrosion rate. A considerable amount of carbon was deposited on the mist extractor during the 6-month period even though the increase in pressure drop between the top and bottom of the tower was nil. Rather than gamble that the carbon buildup would not affect the gas-oil quality prior to the annual spring crude-unit turnaround, the mist extractor has been replaced at 6-month intervals.

In October 1952 the expanded metal support for the mist extractor at the gas-oil drawoff tray failed due to corrosion and was replaced with the new type grid. After 2½ years of operation, the mist extractor itself was also replaced due to carbon buildup. Our policy has been to keep one spare for each location in the tower on hand at all times.

TABLE 2—EFFECT OF REVISED MIST EXTRACTOR

	Before		After	
	Con. carbon	Dilute color	Con. carbon	Dilute color
Vacuum gas oil	0.6	4-5	0.3-.4	2-3
Wax distillate	4-6	8-1	5-7	8+

TABLE 3—PRESENT VACUUM-TOWER OPERATING CONDITIONS

Absolute pressure, mm. Hg:	
Tower top	12
Flash point	24
Temperatures, °F.:	
Tower top	150
Gas-oil drawoff	425
Vapor below gas-oil drawoff	695
Wax dist. drawoff	480
Flash point	735
Tower bottom	720
Heater transfer line	785
Reflux to No. 1 tray	105
Reflux to No. 3 tray	300
Reflux to No. 5 tray	300
Rates, bbl. per day:	
Charge to vacuum tower	15,000
Recycle wax distillate	540
Vacuum gas-oil product	10,150
80/90 S.P. asphalt	4,850
Reflux to No. 1 tray	7,120
Reflux to No. 3 tray	21,200
Reflux to No. 5 tray	815
Vapor velocity, flash zone, ft./sec.	15

Metals contamination down . . . The mist extractors in the vacuum tower have been very effective in removing entrained asphalt from the F.C.C. unit charge stock and thereby preventing metals contamination of the cracking catalyst. The F.C.C. unit hydrogen production is a measure of the degree of metal contamination. Our normal hydrogen production is 25-30 cu. ft. per bbl. of fresh feed. When the expanded metal support for the mist extractor below No. 6 tray failed in October 1951, the F.C.C. unit hydrogen production immediately went from 25-30 to 130-150 cu. ft. per bbl. of fresh feed.

Attempts have been made to clean the fouled mist extractors with various commercial solvents and by burning off the carbon deposit. Neither method has been satisfactory. High temperatures produced in burning the carbon also burns the wire mesh. The carbon deposit on the mesh after treating with a solvent is distributed throughout the mesh and is impossible to remove without separating the mesh layers, which is not practical.

The corrosion problem of the mist-extractor supports has been overcome by substituting stainless for carbon steel. The major problem is now carbon formation on the mist extractor below No. 6 tray. Plans are being made to revamp the vacuum tower internals and operate with one mist extractor located between the wax distillate and gas-oil section of the tower.

. . . Case History—Sinclair Refining Co., E. Chicago

by J. H. Fisher and L. R. Bunger

INCLUSION of wire-mesh entrainment eliminators in the design of new vacuum-reduction units and the redesign of older units for the addition of wire-mesh entrainment eliminators for the production of higher-quality catalytic cracking feed stock have become common practice in the petroleum industry. One new unit and two older units so equipped at Sinclair Refining Co.'s East Chicago, Ind., plant, are discussed in this article with comments from both a mechanical and operating standpoint.

Simplicity of installation, relatively long life, and increased tower capacity with excellent cleanup of metals and carbon residue from catalytic cracking feed stocks combine to make entrainment separators a very attractive proposition.

Refinery expansion . . . Gradual expansion of a refinery from 70,000 to

95,000 bbl. per stream day crude run without a corresponding increase of reduced-crude handling facilities led to excessive vapor velocities on existing vacuum units with resulting high metals content and carbon residue of gas oil overhead. When fed to a fluid catalytic cracking unit, the poor-quality gas oil resulted in the usual catalyst poisoning with high coke yield and poor product distribution.

Initial Installation

In an attempt to obtain immediate relief from this situation, it was decided to install a wire-mesh entrainment separator in one of the vacuum towers. The tower selected was a former tar evaporator, 11 ft. in diameter by 37 ft. high, which had been converted for reduced-crude reduction. Tower internals, following the removal of a bubble tray to provide space for the wire mat (common reference to the wire-mesh entrainment separator), consisted of two perforated baffles below the flash section, a tangential entry with the feed flashing beneath a circumferential hood, a perforated baffle above the flash section and beneath the mat, and a bubble tray above the mat. Reflux is introduced on this top tray which has no weirs, but a downcomer carries liquid run back from the tray through the mat to a seal pan on the perforated plate below. (See Fig. 3.) Disengaging space between the bottom of the circumferential hood and the bottom of the mat is 8 ft. A greater space would be desirable.

Greater disengaging space . . . Results of this first installation indicated the benefits to be derived from a wire-mesh entrainment separator and led immediately to a similar installation in a second vacuum tower. This tower was almost identical with the first, a former tar evaporator converted for reduced crude reduction, except it was only 10 ft. in diameter, but 48 ft. high. Disengaging space in this tower between the bottom of the circumferential hood and the bottom of the mat is 11 ft. Results of this second installation were even better than the first, undoubtedly the result of the greater disengaging space.

Comparative Data

Normal operation of these vacuum units is for 10°-11° A.P.I., 200-250 penetration asphalt bottoms with total gas oil overhead to fluid unit feed. Good comparative data, before and after the mat installation, for the first unit are not available due to variables introduced through its operation in conjunction with another unit; however, good comparative data for the second unit are available and are presented in the following tabulation:

	Without entrainment mat	With entrainment mat
Rates, bbl. per day:		
Overhead	3,185	4,365
Bottoms	1,225	1,685
Feed	4,410	6,050
Temperature, °F.:		
Tower top	710	705
Tower flash	727	725
Tower bottom	711	710
Flash pressure, mm. Hg abs.	62	62
Physical tests:		
Overhead color, N.P.A. dilute	8	4½
Overhead gravity, °A.P.I.	27.5	27.5
Overhead carbon residue, wt. per cent	0.46	0.34
Bottoms gravity, °A.P.I.	11.0	11.0
Feed gravity, °A.P.I.	22.5	22.5
Tower velocity, ft. per sec.	6.02	7.88

Net result of the mat installation in the second tower was 37 per cent increase in overhead capacity while producing a much better quality gas oil as indicated by improved color and a 25 per cent reduction in carbon residue.

Operating conditions . . . These, as presented, are representative but of course vary with feed stock and feed rate. Normal practice is to hold the maximum flash temperature obtainable without excessive cracking and vary the flash pressure to obtain minimum bottoms while maintaining suitable quality (color) on the overhead. The pressure at the flash section is thus varied from 20 to as high as 65 mm. Hg absolute as required.

New Crude Vacuum Unit

As a result of experience with wire-mesh entrainment separators on these two units there was no question concerning the inclusion of a mat in the design of a new 20,000-bbl. per stream day reduced-crude vacuum unit when it was decided to further expand the refinery crude run to 115,000 bbl. daily. Although design of this unit was quite different from the simple vacuum flash units, involving the drawing of well-fractionated side stream associated with lube and wax manufacture, the problem was much the same—the elimination of entrainment which would permit the production of a high-quality, good-color heavy gas-oil bottom side stream for feed to the fluid unit. This cut represents the fraction between 200-250 penetration asphalt bottoms and paraffin distillate. The mat installation is very similar to that for the two smaller units. (See Fig. 4.)

In addition to the entrainment mat above the flash section, this tower includes an entrainment mat at the top for elimination of entrained oil carried

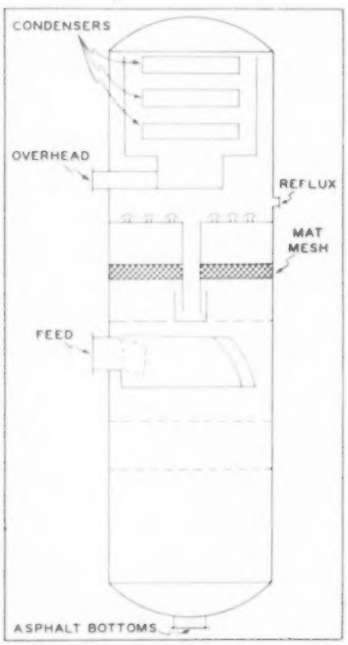


Fig. 3—Initial installation, reduced crude vacuum flash tower with wire-mesh entrainment separator at Sinclair Refining Corp.'s East Chicago, Ind., refinery.

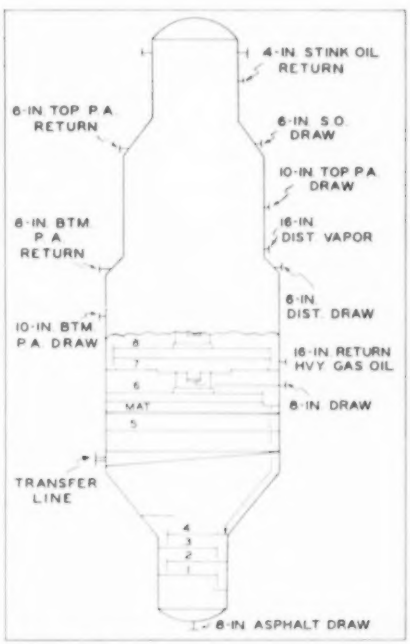


Fig. 4—Later installation of wire-mesh entrainment separator in new 26-ft.-diameter vacuum tower at Sinclair's East Chicago plant.

by process steam leaving the tower on its way to the barometric condensers. A minimum of difficulty with oil carrying into the cooling tower supplying water to the barometrics offers positive proof of the value of this additional application of a wire-mesh entrainment separator.

Tower details . . . The new tower is 94 ft. high and varies in diameter from 26 ft. at the flash section to 8 ft. in the bottom or stripping section with a 21-ft. and a 12-ft. section above the flash. Internals consist of 4 bottom trays for stripping and 15 fractionating or draw trays. The first tray above the flash section and beneath the mat is a perforated baffle without caps. Feed entry is tangential and beneath a circumferential hood, similar to the smaller units. The downcomer from the first fractionating tray above the mat passes through the mat and carries runback through the flash section to a seal pan in the stripping section beneath.

Feed rate . . . Although designed for 20,000-bbl. per stream day feed rate of 22.5° A.P.I. reduced crude, the unit has successfully operated at 27,000 bbl. daily while producing 10°-11° A.P.I., 200-250 penetration asphalt bottoms and a 7 N.P.A. color heavy gas-oil lower sidestream for fluid cat cracking unit feed. Process steam (at the flash section) amounts to 15,000 lb. per hour with flash pressure varied between 75 and 110 mm. Hg absolute for desired asphalt bottoms without excessive overflash. Flash temperature is maintained at approximately 760° F.

Naturally comparative data for this tower operating with and without the entraining mat are not yet available. However, it is definitely known that, without the mat in place, satisfactory color gas oil cannot be produced even though feed rate is reduced to 18,000 bbl. per day. This was determined when, through conditions beyond control, an excessive tower surge resulted in displacement of several sections of the mat. It was necessary to shut the unit down and replace the mat before the difficulty was remedied.

Mesh Installation

Although the above discussion presents quite a favorable picture for wire-mesh entrainment separators, they are not necessarily completely free of difficulties and are relatively expensive. The mat employed in the two older towers is 4 in. thick and made of Type 304 stainless-steel wire mesh installed in two layers, each 2 in. thick. Each layer consists of 1-ft.-wide strips with the top layer installed at a right angle to the bottom layer for more perfect closure and greater rigidity. The wire mesh is purchased prefabricated so as to fit the contour of the vessel and the downcomer with each section identified as to its location to facilitate installation.

Mat support . . . This is a grid of ⅜-in. stainless-steel rods spaced at about 9-in. intervals, welded to the tower and further supported by existing tray supports remaining from the tray removed from the present location of the mat. The bottom layer of the mat is laid at right angles to the grid rods. On top of the mat there is a similar grid, also welded to the tower; however, the top grid is further reinforced by four rods laid at right angles to help hold the mat in place. Further, there are a number of wire loops fastening the various sections to the top and bottom grids to prevent the mat from sliding and separating between the grids.

New tower mesh . . . The mat installation in the new 26-ft.-diameter tower, although essentially the same, differs in that the 1-ft.-wide mat sections are each 4 in. thick. In other words, the mat consisted of a single layer of wire mesh 4 in. thick. The bottom grid, in place of being rods, is a prefabricated grid of flat bars turned on edge and was installed as a part of the original tower internals. The top grid is removable and consists of fabricated sections of expanded steel grating held down by bolting to the bottom grid through the mat. The top grid is a revision to the original installation consisting of a few flat bars and steel bands which lacked strength and permitted the mat to be too easily shifted.

Either type of installation (new tower or old tower) is satisfactory, but the single 4-in. layer of mat requires greater care in obtaining perfect closure between sections; however, it is easier to install and the expanded steel grating is a better top or holddown grid and will withstand much greater tower surges without shifting of the mat.

Shifting of the mat, when operating at high tower velocities, is to be avoided in that entrained asphalt is carried to the tray above the mat and also falls back on top of the mat and forms coke with the result that the tray must be cleaned and the mat replaced with a new one if the resulting poor color overhead is disregarded and operations continued for any length of time.

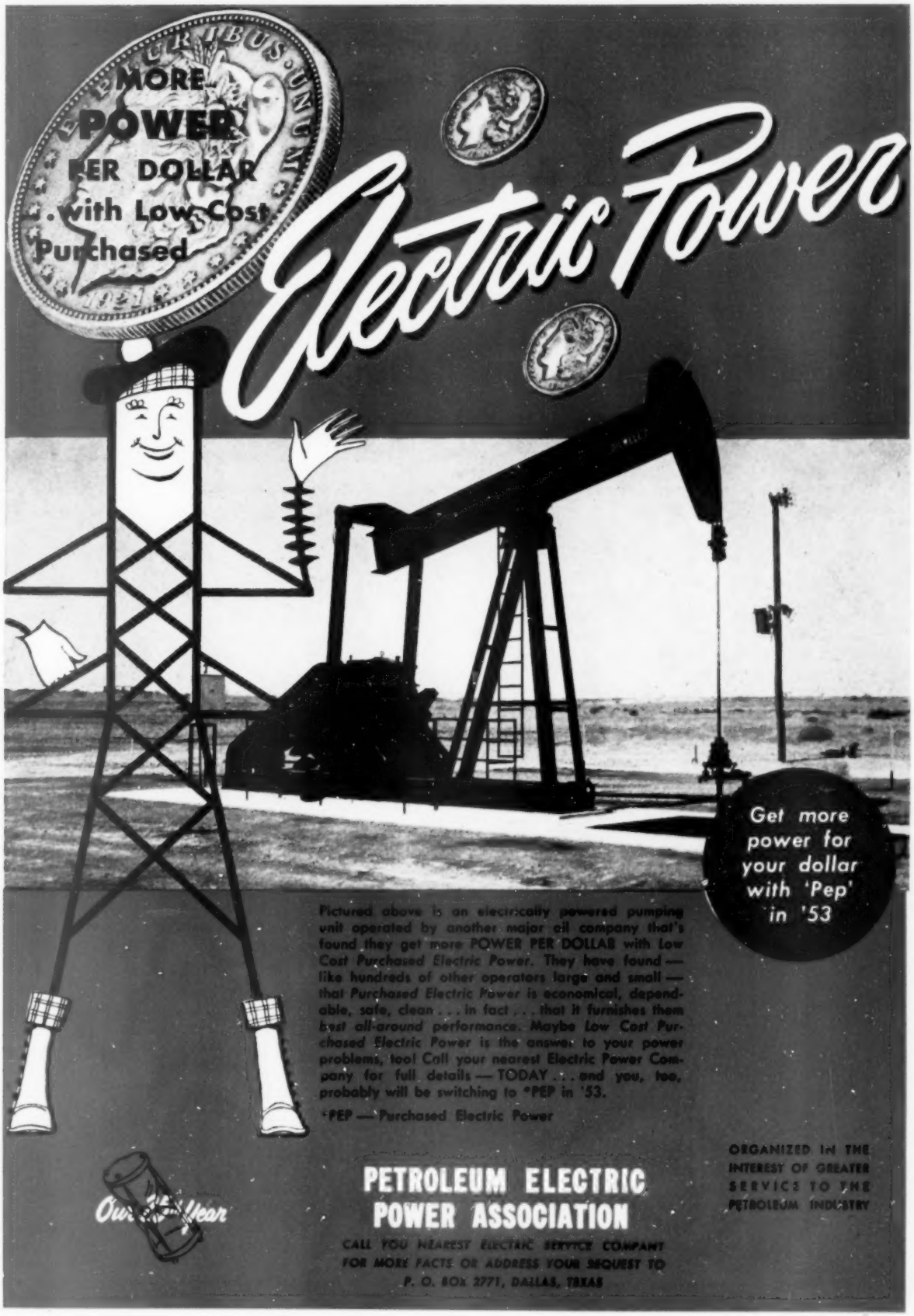
Coking of Mats

In normal operation without serious upsets the mats, which contain about 95 per cent free space, do not become badly coked. Usual practice is to operate the units for about 1 year and change the mat during the annual turnaround. In order to follow coke formation in the mat, differential-pressure taps are installed above and beneath the mat. Initial pressure drop is on the order of 0.2 in. of water. To date maximum pressure drop measured for what appeared to be a heavily coked mat has been about 8 in. of water. Some work has been done on chemical cleaning of mats removed from service; however, results were not satisfactory and no further consideration is being given this proposition. New mats are maintained on automatic replacement at the storehouse.

Downcomer plugged . . . Another cause of coked mats is the plugging (coke) of the downcomer from the bubble tray above the mat due to insufficient runback. The towers of course are operated with minimum overflashing with the result that at times there is essentially no runback with resultant long-time factor in the downcomer and seal pan which leads to coke formation. With the downcomer plugged, liquid is trapped on the tray above and eventually spills over on the mat beneath through the bubble caps. Eventually both the mat and the tray become coked. To remedy the situation a small volume of gas oil is recirculated to the tray above the mat with successful results in that runback is thus assured.

Provide Water Quench

The only other serious difficulty experienced with entrainment mats thus far was the misfortune to have the first mat inspected catch fire when the tower was opened. The tower had been steamed for 5 hours followed by water washing for further cooling. The mat, however, received no water wash in that water wash was introduced at the top of the tower and bypassed the mat by way of the downcomer through the mat from the tray above. Steam alone does not provide sufficient cooling with the result that hot sulfur and coke deposits in the mat flashed on contact with air. The fire was finally extinguished after considerable difficulty, but without damage to equipment other than the mat, by means of streams of water played on the mat through the tower manway. A water-spray system was installed above the mat to guarantee its being cool prior to opening the tower in the future. No further difficulty has been experienced on this tower or on the other old tower which was similarly equipped. On the new tower even more positive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steps are taken for quenching the 26-ft.-diameter mat. The tower is filled with water to a point above the mat and allowed to stand for a short period of time before draining. Although increasing the time required for shutting down, this is considered necessary to insure reaching all sections of this large mat with water.

In conclusion, it is a proven fact that use of wire-mesh entrainment separators in vacuum towers results in higher tower capacities with lower metals and carbon content of gas oil produced. As a result, poisoning of catalytic cracking catalyst is greatly reduced with accompanying higher conversion and better product distribution obtained for a given quantity of coke burned.

Installation in existing or new towers is not particularly difficult but is somewhat expensive and time-consuming as is replacement of the mat which frequently prolongs downtime on a unit by several hours. The expenditure, however, is quickly repaid by higher-value products obtained from improved catalytic cracking yields and lower catalyst costs.

. . . Case History—Rock Island Refining Co., Indianapolis

by C. O. Anderson

ROCK ISLAND REFINING CORP. has two towers operating at less than atmospheric pressure that utilize wire mesh to reduce entrainment. The primary (No. 1) vacuum tower is 7 ft. 6 in. i.d. by 57 ft. 6 in. high. The No. 2 tower (auxiliary vacuum tower) is 6 ft. 6 in. in diameter by 42 ft. high. The auxiliary vacuum tower has one deck with no bubble caps, located 10 ft. below the top. The mist extractor is located midway between the tray and the top of the tower. The inlet to the tower is located about 4 ft. above the bottom tangent.

Primary vacuum tower . . . This has a mist extractor 2 ft. below the top outlet and four condensing trays at 30-in. tray spacing below the top mist extractor. The clean gas-oil withdrawal deck is located immediately below the condensing decks. Intermediate reflux is added to the tower below the gas-oil take, but above the second mist extractor. A bubble deck without caps similar to the one used in the No. 2 vessel is located below the mist extractor. The dirty gas-oil take deck is located below the bubble deck.

There are two inlets into the tower: one located above the clean gas-oil deck receives vapors into the tower. The vacuum coil outlet enters the tower about 5 ft. above the tangent line. Uncondensables leave the tower from the top and go into the vacuum steam jets and barometric condensers. Two gas-oil withdrawals are located as shown in the diagram.

Operating conditions around this unit are shown in the diagram. To date, there has been no corrosion in the equipment.

When the mist extractor was installed in the No. 2 vessel, two conventional bubble decks were completely removed and the bubble caps were removed from a third deck. An existing tray support was utilized to support the mist extractor. We have periodically used reflux and no reflux in the No. 2 vessel above the wire mesh, but have settled on using no reflux.

Mesh locations . . . In the primary vacuum tower, a 4-in. mist extractor was installed above the condensing decks to reduce liquid entrainment in the uncondensables. This section has been in service for over 3 years without any change.

Mesh sections were installed below the clean gas-oil take and also a replacement for two conventional bubble decks. Reflux is added upon this lower mist extractor.

When the mist extractors were installed in the vacuum towers, new condensing decks with less pressure drop were also installed. Unit capacities were not increased appreciably when these changes were made. Prior to the changes, the pressure drop through the primary vacuum tower was in the order of 45 to 50 mm. and after the change, the pressure drop was in the order of 4 to 10 mm. There is a slight pressure-drop increase during operations due to the carbon buildup on the wire mesh.

The two mist extractors in the hot zones are replaced each turnaround; the one in the vacuum tower top has never been replaced.

Cat feed quality . . . The greatest contribution given us by the installation of the mist extractors was the improvement in cat cracker charge. Quality of the cracker charge improved, so the cracker charge could be increased from 4,700 bbl. per day at 53 per cent conversion to 5,500 bbl. per day with 58 per cent conversion with the same amount of air for catalyst regeneration. Vacuum-tower bottoms production was decreased about 1 to 1½ per cent based on charge to the crude unit.

Otto H. York, Inc., is the supplier of the mesh sections used in the vacuum towers. All mesh sections are 4 in. thick and fabricated from Type 304 stainless steel.

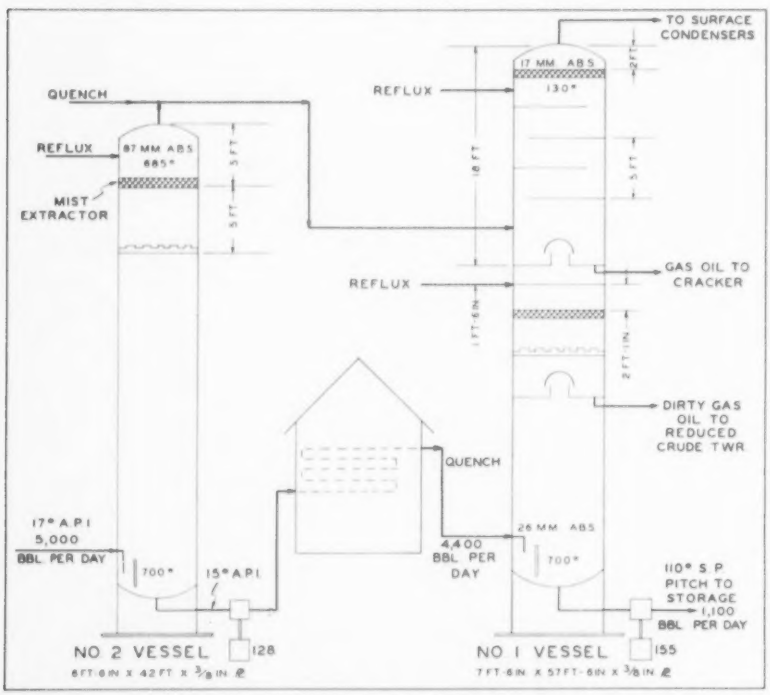
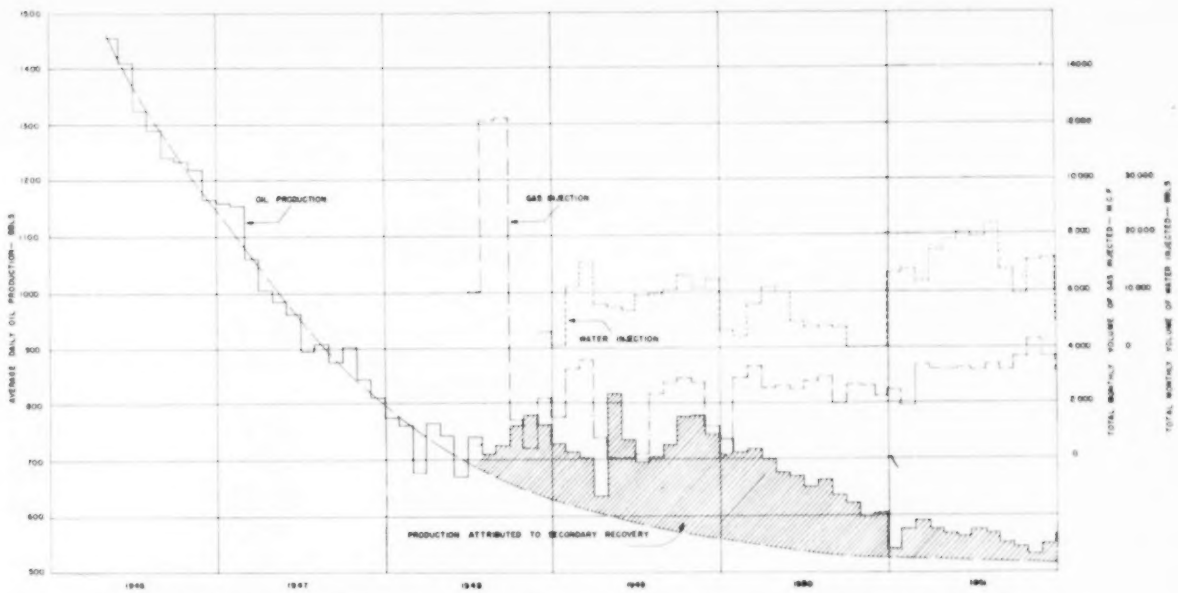


Fig. 5—Installation of wire-mesh separators at Rock Island Refining's Indianapolis refinery.



PRODUCTION INJECTION HISTORY of the 2,400-ft. Garcia reservoir in Alta Mesa field, Brooks County, Texas.

SECONDARY RECOVERY IN TEXAS—2

40 Million Barrels of Additional Oil

. . . estimated as yield from these 34 pressure-maintenance prospects

by William P. Sterne
Gulf Coast District Editor

NEW life is being injected into faltering oil pools in Texas, through carefully planned pressure-maintenance projects. The over-all result will be the realization of many millions of barrels of additional oil which would never have been recovered otherwise.

A review of a recent report of the Texas Railroad Commission[1] reveals that more than 40,000,000 bbl. of additional oil is expected to be realized in two districts alone—3 and 4, where 34 active injection projects are under way. (Districts 1 and 2 projects were discussed in The Oil and Gas Journal, issue of November 2, 1953, on page 105).

There are 13 secondary-recovery projects in operation in District 3, and 21 in District 4.

Following is a progress report on these projects:

DISTRICT 3

Amelia field . . . Discovered in February 1936, this field has an excellent water drive. After the initial decline of reservoir pressure there has been little decline from a pressure of 3,050 psi. Gas injection is expected to add approximately 300,000 bbl. of additional oil. As a result of calculations and additional information obtained from workover operations, it was indicated that the gas cap had contracted, and in order to prevent further loss of oil due to oil wetting the sand as it migrated into the gas cap, the gas-injection program into the gas cap was initiated in December 1946. Up to January 1, 1952, about 3,789,000,000 cu. ft. had been injected through a single injection well.

Esperson Dome (middle Yegua) . . . An additional 863,000 bbl. of oil will be recovered as a result of this project, according to estimates of engineers. The middle Yegua reservoir was discovered in October 1952. Expansion of the gas cap is the primary energy source, with limited water encroachment. Prior to initiation of gas injection in September 1948 there was a drop from original reservoir pressure of 3,191 psi. to 2,764 psi. in producing about 45,000 bbl. of oil. Up to January 1, 1952, about 544,864,000,000 cu. ft. of gas had been injected through one input well. Although pressure has not been maintained in the reservoir, the rapid decline has been checked.

Esperson Dome (basal Yegua) . . . This reservoir of Esperson Dome field in Liberty County was discovered in March 1942. Gas-cap expansion and gravity drainage are chief energy sources, with a water drive effective to a limited extent. Reservoir-pressure decline from the estimated original of 3,979 psi. has been small—to 3,142 psi. as of January 1, 1948. During this period the sand had produced about 250,000 bbl. of oil, or approximately 300 bbl. per pound drop in bottom-hole pressure. Gas injection was begun in May 1948. As of January 1, 1952, a total of 1,217,272,000 cu. ft. of gas had been injected into the gas cap through one injection well. Rapid pressure decline has been halted, and engineers estimate that an additional 1,273,000 bbl. of oil will be produced as a result of the program.

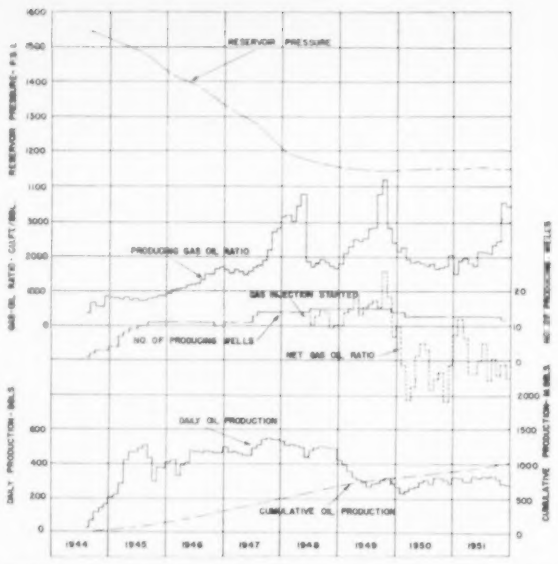
Esperson Dome, South field . . . Reservoir of this field is a lens of Crockett sand on the southeast flank of the Esperson Dome. Oil was first discovered in the zone in January 1939. Prior to pressure-maintenance, indications were that the field had only a limited water drive and gravity drainage, under the conditions of operation, which had been only partly effective. Pressures had dropped steadily and gas-oil ratios increased especially in the upper portion of the reservoir. Conditions in this segment for the most part are favorable to gravity drainage. Dips are steep and the oil has a rather low viscosity and low surface tension under existing pressure. Permeabilities are moderately good. A gas-injection program was started in September 1949. As of January 1, 1952, about 1,985,000,000 cu. ft. of gas had been injected through one input well. Present conditions indicate that the main sources of energy for producing the reservoir are gas-cap expansion and gravity drainage, with water drive effective only to a limited extent.

Water injection was begun in November 1951, and 24,135 bbl. had been injected to January 1, 1952. Decline in reservoir pressure has been stopped, and it is estimated that the project will result in recovery of an additional 1,180,000 bbl. of oil.

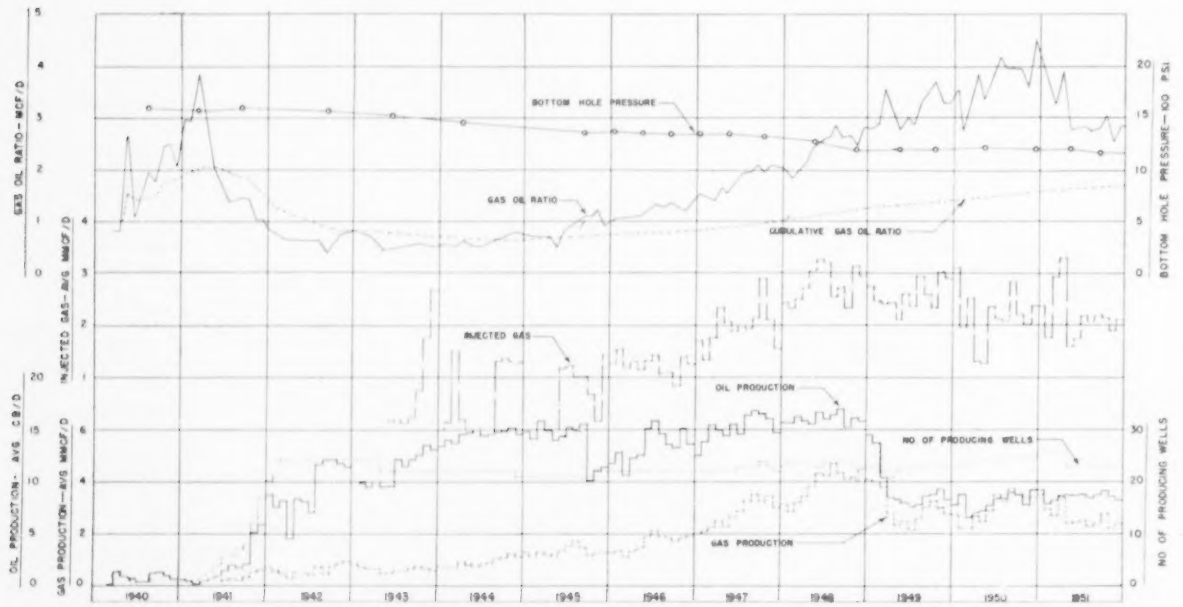
Fairbanks field . . . This field, in Harris County, was discovered in January 1948. The Yegua formation, which is now undergoing gas injection, is found at about 6,800 ft. Reservoir energy is derived from an expanding gas cap. Injection into the gas cap was initiated in August 1947. As of January 1, 1952, gas equivalent to an estimated 22,882,000 bbl. of reservoir space had been injected through three input wells. This has greatly decreased reservoir voidage, although the reservoir pressure continues to drop. Engineers estimate an additional 2,000,000 bbl. of oil will be recovered.

Kirby field . . . Discovered in 1943, this field in Liberty County is located on the southwest flank of the Esperson Dome, and the 419 productive acres of the middle Yegua formation, which is undergoing pressure maintenance, is bounded by faults. This fault block has 2,000 ft. of closure, indicating a very steep dip. Before injection was started, it was indicated that natural water influx into the reservoir had been negligible and that reservoir energy was derived primarily from expansion of solution gas. Reservoir pressure had dropped sharply and the field average gas-oil ratio increased quickly in early life of the field due to high production rates. However, it declined when the allowable was reduced. But just prior to start of the injection, ratios were increasing steadily, because the stage of depletion of the reservoir was such that the permeability to gas was rapidly increasing.

It was apparent, then, that this would result in quicker pressure decline, unless steps were taken to maintain the pressure. Gas injection started in January 1949. Within 3 years approximately 769,542,000 cu. ft. of gas had been injected into the gas cap through three gas-injection wells. To supplement this gas-injection project, water injection was started in February 1950, and a total of 214,291 bbl. had been

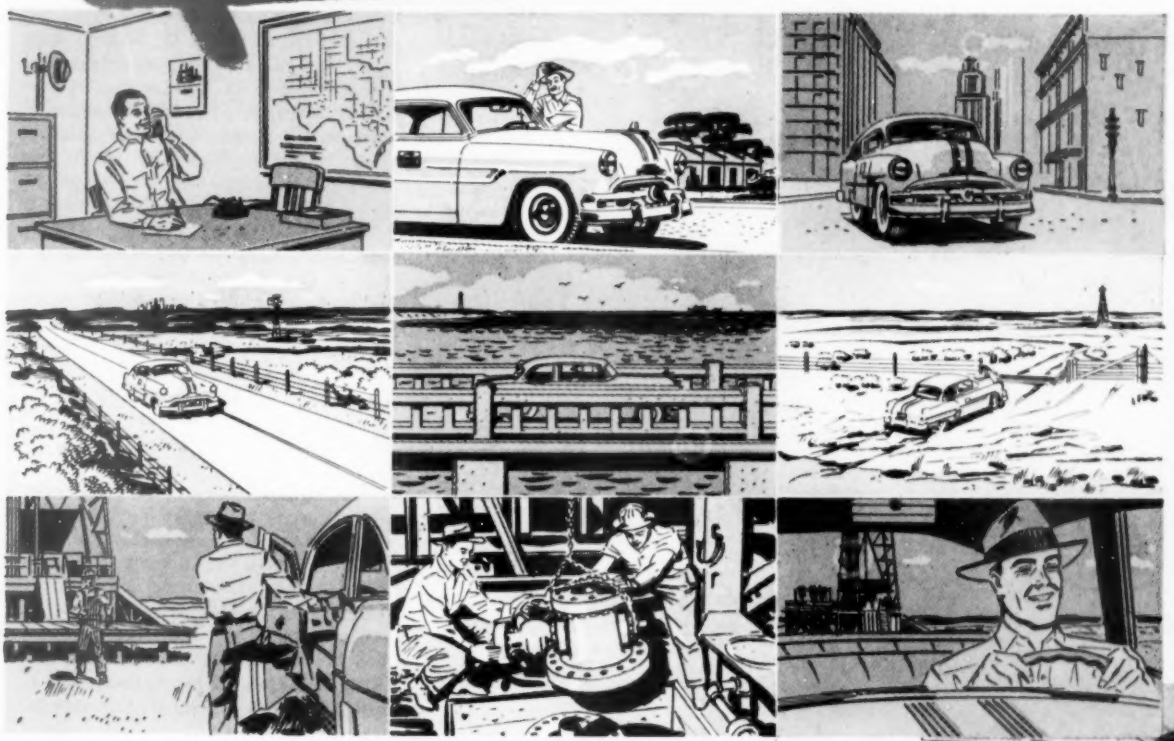


FROST "A" MAIN RESERVOIR in Garcia field, Starr County, Texas.



RESERVOIR PERFORMANCE HISTORY of the Frio "E" sand (north), Rincon field.

CAN YOU FIND THE MORAL TO THIS STORY?



At O-C-T, we believe good field service to our customers is just as important as building good wellhead equipment. As a result, we are as conscious of the working conditions of our field servicemen as we are the working condition of O-C-T equipment. When your O-C-T representative answers your service call, he is equipped to travel quickly and comfortably to your well. We believe this enables him to do a better job for you. We suggest that you consider service as well as equipment on your next well. O-C-T is the leader on both counts.

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injected as of January 1, 1952, through one water-input well. Reservoir-pressure decline has been checked as a result, and engineers estimate that an additional 2,277,700 bbl. of oil will be recovered as a result of the fluid injection into the reservoir.

Lovell's Lake field . . . The Frio 1 reservoir of this field, located in Jefferson County, was found oil productive in February 1938. Gas injection was initiated in December 1941 to maintain reservoir pressure and prevent gas-cap shrinkage. An estimated 15,000,000,000 cu. ft. of gas had been injected through two input wells, as of January 1, 1952. Shrinkage of the gas cap has been controlled and reservoir pressure maintained.

Midfields field . . . The West Zone sand of this field which is in Jefferson County, was discovered in January 1946, with production from a simple unfaulted anticlinal structure that is elongated generally on a northeast-southwest axis. Original ratio of gas-cap volume to oil-zone volume was about 2.8 to 1. Gas injection started in October 1950 in an effort to maintain pressure, prevent gas-cap shrinkage, and minimize retrograde losses. Reservoir-pressure decline has not been completely arrested; however, there has been noted a definite decrease in rate of decline while producing at relatively high rates. An additional 3,778,000 bbl. of oil will be recovered as a result of the injection project, according to engineers.

Olive field . . . Located in Hardin County, this field is productive in the Wilcox formation, which is found at an average depth of 10,000 ft. At original reservoir pressure of 6,300 psi. and temperature of 250° F., it was indicated that fluids were only slightly below the critical point. Analysis of bottom-hole samples revealed the reservoir fluid had an extremely high solution gas-oil ratio of about 5,000 to 1, and a large formation-volume factor of about 3.5.

With this type of fluid, it is important to try to arrest the pressure decline below the saturation pressure at only a few hundred pounds; (i.e., with only a 100-lb. drop, 34 per cent of the solution gas is released. With a 750-lb. pressure drop, 70 per cent of solution gas is released). It has been estimated that in other fields with this type fluid, 9 per cent of the stock-tank oil in place could be recovered by primary means without pressure maintenance. It has been estimated that about 20 per cent of the fluids in place have been recovered in this field, which would represent an excellent recovery factor for a solution gas-type reservoir and this type fluid. Engineers estimate that 112,000 bbl. of additional oil had been recovered as a result of the injection project before it was discontinued in June 1952.

Oyster Bayou field . . . Located in Chambers County, this field's main reservoir is the Seabreeze, in a trapezoidal-shaped fault block of approximately 1,500 acres in areal extent. Total closure of the reservoir is 240 ft., with gas originally occupying the upper 60 ft. and oil the lower 180 ft.

Oil sand consists of two interconnected members with different sand characteristics, and although there is a difference in characteristics, reservoir-pressure history and geological data indicate that the two members act as a common reservoir.

Data indicated the reservoir could be most efficiently operated by injecting water to maintain reservoir pressure, so water injection was started in December 1950. As of January 1, 1952, about 2,833,000 bbl. of water had been injected through two input wells and pressure has been maintained in the reservoir. An additional 3,000,000 bbl. is expected to be recovered as a result of the program.

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Seabreeze field . . . The No. 3 Frio reservoir of this field, in Chambers County, was discovered in November 1946. It is located on a complexly faulted and deep-seated domal-type structure. Gas was injected for some time but this was later discontinued due to possible channeling. Water injection, started in July 1946, has been successful in arresting the reservoir-pressure decline. No evidence of water channeling has been noted, and the project is considered a success. About 825,000 bbl. of oil will be recovered as a direct result.

Sugarland field . . . This field, in Fort Bend County, was discovered productive in the Frio in March 1928. It has been produced by limited water drive, supplemented by pressure maintenance with gas injection, started in 1930.

At that time reservoir pressure had declined to about 1,280 psi. This increased 100 psi. before gas injection was discontinued in October 1937. Gas injection was resumed in March 1938 and continued until November 1941. When production rates increased in 1943 reservoir pressure again started to decline rapidly. Gas injection was again resumed in November 1943, and, coupled with reduced withdrawals, halted the pressure decline in 1945. Reservoir pressure was 1,282 psi. in December that year. Except for minor variations it has remained at a value of 1,280 psi. for the period from 1945 to January 1952. Thus, there has been essentially no change in reservoir pressure in the 21 years since the return of gas for pressure maintenance was started in 1931.

West Columbia, new field . . . About 80 acres in the west fault block of this field comprises the reservoir, which is bounded on the north and south by faults, by a pinchout against a salt dome on the east, and by a water contact on the west or downdip side. There are four productive intervals in the Frio series in the fault block, all with common water-oil contact and the same original reservoir pressure. Dip of the formation is about 26½°. Salt water is injected below water-oil contact in each of the four producing zones, through two dually completed injection wells. An additional 1,457,000 bbl. of oil is expected to be recovered.

DISTRICT 4

Agua Dulce (Wright) . . . Structure of the Wright pay zone of Agua Dulce field in Nueces County is that of an anticline with fault closure to the west. Discovered in October 1945, as of January 1, 1952, a total of 406,757,000 cu. ft. of gas had been injected into

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SEALOL — exclusive representative in the United States and Canada for Flexibox — offers the oil refinery industry a complete and tested line of mechanical seals for process pumps. Flexibox Seals come to this country with over 15 years of actual oil refinery service behind them. They afford safety and security never before obtainable with conventional stuffing boxes.

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Many major oil refining companies throughout England, on the Continent, and in South and Central America have standardized on Flexibox mechanical seals for their process pumps. Write for Bulletin 9. Sealol Corporation, 15 Willard Avenue, Providence 5, Rhode Island. Chicago • Cleveland • Houston • Los Angeles Philadelphia • Tulsa • Montreal, Canada. Flexibox, Ltd., Manchester, England.

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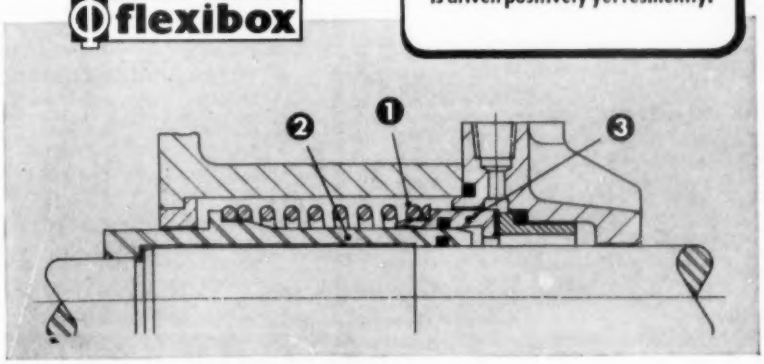

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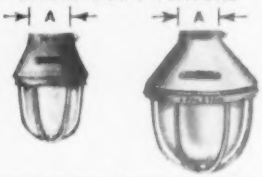

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the gas cap through a single input well. Reservoir-pressure decline has been stopped, and engineers estimate about 200,000 bbl. of additional oil will be recovered.

Alta Mesa . . . The Garcia pay of Alta Mesa field, in Brooks County, was found in 1936 at a depth of 2,400 ft. Production had declined steadily for a number of years prior to start of gas injection in July 1948. At that time all wells completed in the sand were near their economic limit. This undertaking is still in the developmental stage, and increase in production noted to date has been due primarily to gas injection, since some difficulty has been experienced in injecting water. Only about 24 per cent of the oil could be recovered by primary means, but estimates run as high as 50 per cent, or an additional 2,000,000 bbl. of oil, can be recovered by secondary operations.

Benavides (Parr sand) . . . Production from this field, found in 1937 in the Parr sand, is from a stratigraphic trap on the southeast flank of North Sweden dome, with a major fault on the east flank of the reservoir. Gas repressuring was started in August 1943. As of January 1, 1952, an estimated 1,050,000 bbl. of oil had been recovered as a direct result. A pilot water flood was initiated in March 1952.

Ben Bolt . . . Located in Jim Wells County, this field, discovered in May 1939, is producing from the Ben Bolt sand (Vicksburg). Structure is a monocline, closed on the northwest by a sand pinchout, on the south by a fault, and with an oil-water contact on the east. A gas cap is present on the west side of the field, with reservoir volume about one and one-half times the reservoir oil volume. Original water-oil contact was about 5,080 ft. subsea. Before injection it was indicated the water table had risen 40 ft. when some wells started producing water from perforations at 4,050 ft. However, material-balance calculations indicated the water level had not risen appreciably. It was concluded that water production was a result of fingering of water to the wells, which would result in trapping of pockets of oil. Gas injection began in December 1948 to prevent fingering of water and to keep up reservoir pressure, which had dropped from an original 2,300 psi. to about 1,500 psi. Had this pressure decline been allowed to continue, results would have been rapidly increased gas-oil ratios with a resultant loss in ultimate recovery. To January 1, 1952, about 2,400,000,000 cu. ft. of gas had been injected into the gas cap through two input wells. This has effectively maintained reservoir pressures and will increase ultimate recovery.

Boyle . . . Located in Starr County, Boyle field was discovered in January 1945, with production in the Frio "J" sand. Structure is a monocline with shale and/or permeability barriers on all sides with the exception of the southeast corner, bounded by a small fault. After it was indicated that only about 18 per cent of oil in place would be recovered by primary methods, a pilot low-pressure gas sweep was initiated in February 1951. Results are not yet conclusive as to effectiveness of the project, but it appears that some benefits have been obtained. An additional 135,000 bbl. of oil will be recovered, according to engineers' estimates.

Colorado field . . . This field in Jim Hogg County was discovered in September 1936 and produces from the Colorado sand (Eocene). Structure is a monocline with a dip of about 150 ft. per mile to the east. Sand pinches out both to the east and west, and two small gas caps are present on the west edge of the field. Reservoir energy has

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ENARDO No. 570 LB. VAPOR CONTROL HATCH

ENARDO No. 530 VAPOR CONTROL HATCH

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The Enardo 1900 series diaphragm type in-line vent valve has been specifically designed to work in conjunction with the Enardo Vapor Control Hatches. This valve accurately controls the gases in the connecting vent line without metering, vibration or hammering. Available in 2", 3" and 4" diameters with pressure ranges from 2 to 16 ounces. Standard vacuum setting of .4 ounces. FOR COMPLETE DETAILS AND PRICES ON THE ENARDO VAPOR CONTROL SYSTEM WRITE . . .

ENARDO manufacturing company

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been derived from expansion of gas in solution. Reservoir pressure had declined to about 200 psi. as of the end of 1951.

Completions in the south end of the field, drilled on 10-acre spacing, have low producing capabilities and wells in the central and north sections which were developed on 20 and 40-acre spacing, have greater producing capabilities. The cooperative pilot waterflood project covers 360 acres in the extreme south part of the field, and was put in operation in May 1951. Reservoir in this area of the field was about 50 psi. at the start of the flood. An irregular five-spot pattern with 20-acre spacing is being used.

Salt water from the regional Pettus sand is filtered and injected through a closed system by gravity. Water has been injected without trouble and there has been no premature channeling of water from injection wells to producing wells.

Conoco Driscoll . . . Located in Duval County, production from this field comes from the upper First Government Wells sand, which was discovered in the area in June 1934. Structure is a nose-type area trending northwest-southeast, with an oil ring on the southeast, south, and southwest flanks. Primary source of energy is gas-cap expansion. Gas injection was started in March 1940 for pressure maintenance. As of January 1, 1952, about 36,720,000,000 cu. ft. of gas had been injected into the gas cap through three input wells. More than 8,500,000 bbl. of oil has been produced, with pressure maintained at or near saturation pressure to January 1, 1952.

Edlasater . . . Production from this field, which is in Jim Hogg County, is on the downthrown side of a down-to-the-coast fault. A gas cap is present and the field has limited water drive. Gas injection was begun in September 1951. As of January 1, 1952, about 90,700,000 cu. ft. had been injected through a single well into the gas cap. There apparently has been a decrease in rate of production decline, and reservoir pressure has not declined appreciably since the project was initiated.

Garcia . . . First well of this field was finaled in Frost "A" reservoir, in Starr County, August 1944. Gas injection started in June 1948 through one input well, to maintain pressure. About 1,093,000,000 cu. ft. of gas had been injected into the gas cap to January 1, 1952. There has been little deviation from a pressure of 1,150 psi. since start of the injection project.

Government Wells, North . . . There are three water-flood projects in operation in North Government Wells reservoir of this field, in Duval County. Seven wells were drilled on The Texas Co. Riggs lease in 1932 and 1933. At the time of the start of injection in January 1949, the three remaining wells were each producing about 4 to 5 bbl. of oil daily with no water. As of January 1, 1952, more than 100,000 bbl. of water had been injected by gravity below the water-oil contact, through one injection well. Three wells on the lease now average 8 or 9 bbl. of oil per well per day. Sun Oil Co. started a pilot flood in March 1948 on its Wiederkehr lease. A five-spot pattern with 20-acre spacing is being used. To January 1, 1952, about 1,633,000 bbl. of water had been injected through 15 input wells. To date, about 69,883 bbl. of oil has been produced as a result of water injection. Shell started a third injection program in Government Wells sand in June 1952.

Hoffman (lower Cole) . . . Production from this field, found in August 1947 in the lower Cole sand, is from a closed-type reservoir at a depth of 2,300 ft. Original reservoir pressure was 793 psi. and the 22°-gravity crude was undersaturated, containing less than 100 cu. ft. of gas per barrel of oil. Thus it was evident the greater part of oil recovery by primary means would be by solution gas drive and that this would be of a low order. Pressure maintenance began in August 1948 and a great part of the reservoir was unitized in October 1950 to aid in operating practices. Water was injected in southeast flank wells, but low-pressure areas developed upstructure, and a peripheral pattern of injection was necessary. There were 20 water-input wells operating around the periphery as of January 1, 1952, with total daily injection rate of 12,215 bbl. of water. More than 8,100,000 bbl. of water had been injected to that date. As of March 1, 1952, the average reservoir pressure was about 835 psi., representing an increase of 52 psi. over the original pressure, after having produced about 2,860,000 bbl. of oil.

Without the water-injection program, about 21 per cent of oil in place would have been recovered. Through use of water injection, 45.6 per cent of oil in place will be recovered—more than doubling primary recovery.

East Longhorn (Woodley) . . . This structure is a sand pinchout on a terrace. Strike faults separate the field from Atlee, Longhorn, and Sweden fields. Gas injection into the gas cap was started in 1947 and continued until 1951. During this period about 752,454,000 cu. ft. was injected, which effectively retarded water encroachment for a 1-year period. Water injection began in April 1950 and about 101,000 bbl. had been injected below the water-oil contact through a single input well, as of January 1, 1952. About 100,000 bbl. of oil is credited to fluid injections.

Piedre Lumbre field . . . This field was discovered in August 1935 and produces from the Government Wells sand. Structure is a monocline bounded by a fault on southeast side and sand pinchout on all other sides, except for the northeast, where water is encroaching. As a result of this water encroachment, the northeast half is under influence of a moderately active water drive. Water-flood program has been inaugurated in the southwest half of the field to stop drastic decline in production being experienced in this section. A pilot flood has proved successful to date.

Plymouth (Heep sand) . . . Discovered in 1935, the Heep sand of Plymouth field has been gas-injected since November 1938. Before pressure maintenance began, rate of production was high and reservoir pressure was declining at a constant rate. However, after injection started, allowable production from the sand was curtailed. As a result of injection and curtailment of production, the pressure decline was checked. A gas-injection and production-control program has been carried on, which has effectively maintained the reservoir pressure, controlled edge-water encroachment, and prolonged flowing life of the field. Increased recoverable oil reserves of 60 per cent are estimated.

Richard King . . . The upper 5,400-ft. "A" reservoir was found in December 1940. An original gas cap was present but was ineffective because it was less than 10 per cent of the size of the oil zone. In August 1946 injection into the gas cap was initiated, and up to January 1, 1952, about 7,671,000,000 cu. ft. of gas had been injected. This has resulted in arresting the reservoir-pressure decline and the gas cap has become more effective as a driving medium. Original estimates were that 35 per cent of the oil in place would be recoverable by primary methods, but under pressure maintenance, increased recovery will be from a minimum of 5 per cent to a maximum of 12 per cent over the primary recovery.

Rincon field . . . A number of the Frio

sands in Rincon field are presently undergoing gas injection. The reservoirs are all lenticular, on the north flank of a large asymmetrical nose which plunges gently to the northeast. A fault exists along the east flank.

The Frio main "D" sand was discovered in February 1940. Gas injection was started in May 1941. As of January 1, 1952, about 10,261,000,000 cu. ft. of gas had been injected into the gas cap through a single input well. None of the oil produced to date can be attributed to pressure maintenance, but it is felt that progress has resulted in more efficient rate of production, maintenance of low viscosity of oil, and ultimate oil recovery greatly in excess of that obtained through primary means.

The Frio "E" sand (north) was found in March 1940, and there are an estimated 2,436 productive acres in the lenticular pay. Gas injection started in June 1943. Up to January 1, 1952, about 5,403,000,000 cu. ft. of gas had been injected into the gas cap through two input wells. Estimates are that a minimum of 1,000,000 bbl. of oil will be recovered as a direct result of the pressure-maintenance program.

Production from the Frio "G" sand (main) was found in March 1940. There are about 3,283 acres in the productive area, and gas injection for pressure maintenance was started in May 1941. About 15,154,000,000 cu. ft. of gas had been injected into the gas cap up to the first of 1952. Reservoir pressure as a result is declining at a retarded rate.

The Frio "H" sand, found in August 1941, is lenticular and covers about 1,833 productive acres. Up to January 1952 an estimated 13,200,000,000 cu. ft. of gas had been injected into the gas cap since start of gas injection in May 1947. No conclusive results of this project are apparent as yet.

San Pablo . . . This field produces from the Yeager, found in February 1948. Gas injection into the gas cap started in September 1949 to prevent gas-cap shrinkage and control water encroachment. About 392 of the 736 productive acres are affected. Up to January 1952, about 500,000,000 cu. ft. had been injected through a single input well, and estimates are the area affected by the injected gas will have an ultimate recovery of about 30 to 100 per cent greater than that portion of the reservoir not affected by the program.

Squire . . . Four reservoirs are undergoing pressure maintenance in this field. Structure is a monocline dipping to the southeast, closed on the west by faulting, and on the north by sand pinchout. Gas injection into each of the four reservoirs began in March 1950.

Stratton field . . . Two zones, the Bertram and Wardner, are undergoing pressure maintenance. Field structure is a faulted anticline on the Vicksburg trend. Gas injection in each reservoir was started to protect correlative rights of gas-cap operators. Injection has resulted in partial pressure maintenance in both zones. About 188,830,000,000 cu. ft. had been injected up to January 1, 1952, into Bertram zone. Approximately 132,584,000,000 cu. ft. had been injected into the Wardner. Reservoir pressure is now generally stabilized in the Wardner and decline has been retarded in the Bertram.

Turkey Creek . . . Douglas pay was discovered in January 1938. Structure is an anticline with a fault on the east and a sand pinchout on the south and northwest. The field was unitized and pressure-maintenance work started in October 1942. Casing-head gas is gathered and injected into the gas cap and water is injected below the water-oil contact. Reservoir pressure has been maintained as a result and an additional 1,750,000 bbl. of oil are expected to be recovered.

East White Point (Section 63) . . . This field produces from the Brigham sand. The portion of the reservoir under pressure maintenance is the southeast section of an anticlinal structure with a northeast - southwest axis. Productive area is about 400 acres in this part of the field. Active water drive of the Brigham sand was supplemented with gas injection, which has aided in controlling rate of water encroachment and helped maintain reservoir pressure. Gas injection started in June 1946. As of January 1, 1952, more than 2,000,000,000 cu. ft. of gas had been injected into the gas cap through one input well. Pressure has been maintained above 2,400 psi. About 150 bbl. per acre-foot will be recovered as a result.

Reference

1. "A Survey of Secondary-Recovery and Pressure-Maintenance Operations in Texas to 1952," compiled by the engineering department, Railroad Commission of Texas.

What About Aromatics Demand?

(Continued from page 84)

compete for some of the market for phthalic anhydride and perhaps be substituted for some maleic applications. One company has already announced its intention to build an isophthalic acid plant. A low-value xylene fraction would make it more competitive. These are developments that may be watched closely in setting up marketing policies. It is believed that in a few years the xylene isomers will become very important building blocks for the chemical industry.

Naphthalene and phthalic anhydride . . . The naphthalene goal approved by DPA provided for an increase in productive capacity of approximately 200,000,000 lb. per year over the 1951 capacity. This coincided with the approximate expected increase in phthalic anhydride capacity of around 150,000,000 lb. and allowed slight increases in other naphthalene uses. This was based on the United States being self-sufficient for defense reasons as it was found during World War II that naphthalene imports which had been of a magnitude of 40,000,000 lb. per year suddenly dried up, and it was necessary to scurry about to meet bare minimum requirements from domestic production on short notice. We were plagued with a naphthalene shortage all through the war. We also found ourselves in short supply during early 1951.

However, since that time the United States capacity has increased and imports have also increased up to 92,000,000 lb. during 1952 and close to 48,000,000 lb. during the first half of 1953, plus the equivalent of 8,000,000 lb. of naphthalene imported as phthalic anhydride during that period. This coupled with an extended shutdown of one phthalic anhydride plant has created a bad domestic market situation on naphthalene for this year.

Tricresylphosphate

During the past summer there has developed a new use for tricresylphosphate as an additive to premium gasoline where it acts as a motor cleaner to prevent deposits of "lead" in the motor head and keeps spark plugs clean. A second company has recently started using TCP. This additional use of TCP, of course, is reflected in increased requirements for cresol and although the use is still small, if all premium gasoline were to use this additive, it could double the current total cresol requirements.

The new applications point up the versatility of the important products in the fast-growing organic-chemical industry. Once in a while the market situation may look dark for some of these products and one may feel that there is overproduction and that a particular product has reached its peak usage and may even be supplanted by some other product. These important products will always be in demand, though the end use patterns may change.

WHAT ABOUT THIS NEW J&L SPRINGKORE WIRE LINE?

Some Interesting Facts —

LEFT: Unretouched photograph of section of J&L SpringKore rotary drilling line worn out in service. Strand removed to expose coiled steel spring core.

Note that core looks just like it did the day the rope was made except for faint indentations where wires of the inner strands nested against it for countless ton miles.

In the meantime that grease-packed core has exerted a wonderful protective and stabilizing influence. It has cushioned and lubricated the drilling line at every turn around drum and sheaves. It has worked like sleepless radar to guard against crushing from weight and pressure — to hold that line uniform in diameter and circumference, come what may.

And what does the industry think about this new line? Our list of SpringKore customers reads like a Who's Who in the rotary drilling business. Ask to see it.

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How to Design and Evaluate Absorbers—3

by R. J. Hull and K. Raymond

IT was pointed out earlier that this absorber design procedure includes empirical correlations which are derived from actual absorber performance. In order to be broadly applicable these correlations were developed from the widest possible range of variables involved in absorber operations.

Absorber correlations . . . Data were studied from 192 absorber test runs which covered a wide range of pressure, intake gas composition, lean-oil characteristics, weight ratio of lean oil to intake gas, and number, design, and loading characteristics of trays. Fig. 9, to be given later, will show the range of the investigation in terms of pressure and weight ratio lean oil to intake gas. Weight ratio rather than molal ratio is used in certain correlations herein because the weight ratio is more important when considering absorber temperature rise.

Pressure ranges . . . Treatment of the absorber data was divided into operation in the 40-900-psig. range and operation in the 1,400-2,100-psig. range. No data were available in the 900-1,400-psig. range which is understandable because it is a seldom used range between maximum gas-transmission line pressures and minimum recycling-plant pressures. Certain correlations developed from the data are applicable only to the specific pressure range in question while others are applicable to both pressure ranges.

I. Terminal Temperatures

The key to the over-all absorber heat balance is the establishment of either the discharge-gas or the rich-oil temperature. In light-hydrocarbon fractionator design the corresponding problem can be handled easily by application of the familiar dew-point relations for the column-overhead temperature and the bubble-point relation for bottoms-product temperature. Use of these relations is not applicable to absorber design where methane is a major component. A large contribution to the dew point is from small amounts of lean oil of unknown equilibrium characteristics and a large contribution to the bubble point is from methane having equilibrium relationships relatively insensitive to temperature changes. Thus, in order to establish the key temperatures for absorber design it is necessary either to resort to tedious tray-by-tray heat balances or to use empirical correlations of suitable accuracy that require little effort. When one of the key temperatures is established, the other readily is calculated by an over-all heat balance using Equation 2. (See Part 2, issue of November 16.)

At the usual commercial extraction percentages for propane and butane, absorbers in the 40-900-psig. range all have weight ratios of lean oil to intake gas from slightly below 1.0 to 5.0 or above. The methods and correlations given here are not suitable for 40-900-psig. absorbers operating at weight ratios less than about 0.8.

Lean-oil temperature . . . Because lean oil is the principal heat-balance quantity in the top section of the column, the temperature rise of the lean oil from lean-oil temperature to absorber-top-section temperature (discharge-gas temperature) can be expected to correlate with the heat evolved in the top section of the absorber per unit weight of lean oil. For reasons discussed later, the "top section" may be thought of as the average of the top three actual trays, or as the top theoretical tray.

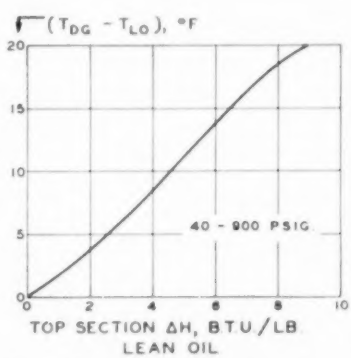

Fig. 3—Discharge gas minus lean-oil temperature, as developed from test data over pressure range from 40 to 900 psig.

Fig. 3 shows the discharge-gas minus lean-oil temperature relationship which was developed from test data. The actual point deviations from the correlation are surprisingly small, about ±3° F. maximum. The average slope of the line is 2.0° F. temperature rise per B.t.u. heat released per pound of lean oil, obviously because all normal lean oils have specific heats near 0.5 B.t.u./lb./° F.

Top-section heat of absorption can be calculated from the composition and quantity of liquid in the top section of the absorber. Mole fractions of components absorbed in the top section liquid are determined from Equation 4 which is derived from the basic material-balance equation and the equilibrium relation $y_{DG_i} = K_{DG_i} x_i$, where y_{DG_i} is the mole fraction of the component in question in the discharge gas, K_{DG_i} is the equilibrium constant for the component in question at the column pressure and discharge-gas temperature (top-section temperature), and x_i is the mole fraction of the component in question in top-section liquid.

$$x_i = y_{DG_i}(V_{DG}/V_{DG_i})\frac{(1-F)}{K_{DG_i}} + \frac{F L_o x_{o_i}}{K_{DG_i} V_{DG_i} A_C} \qquad (4)$$

where light fractions in lean oil are negligible, the second term of Equation 4 becomes zero. Trial and error are involved in evaluating the above expression because K_{DG_i} is dependent upon the discharge-gas temperature. However, this is not a tedious

Authors are with California Research Corp., La Habra, Calif. Paper presented at C.N.G.A. meeting, Los Angeles, October 8-9.

procedure because the equilibrium constants of the components present in the top section liquid are not very temperature sensitive.

The total quantity of liquid in the top section is determined from the expression:

$$L_1 = \frac{L_o}{1 - \Sigma x_1} \qquad (5)$$

where Σx_1 is the sum of mole fractions of components absorbed in the top-section liquid. The quantity of each component absorbed is $L_1 x_1$ from which the contribution to top-section heat of absorption can be obtained by converting from the mole basis to a weight basis and multiplying by the component ΔH value obtained from Fig. 1 of Part 2.

Equilibrium Constants

An equilibrium-constant chart is presented here for nitrogen.[1] Other charts will be given for carbon dioxide,[2] hydrogen sulfide,[1] and the paraffinic light hydrocarbons, methane through n-hexane. These charts are based, insofar as possible, on data for systems similar to normal absorption oil systems. Olefin hydrocarbon values may be obtained by plotting log K vs. normal boiling point for several paraffins at the desired pressure. Olefin values are then obtained by interpolation at their own normal boiling points.

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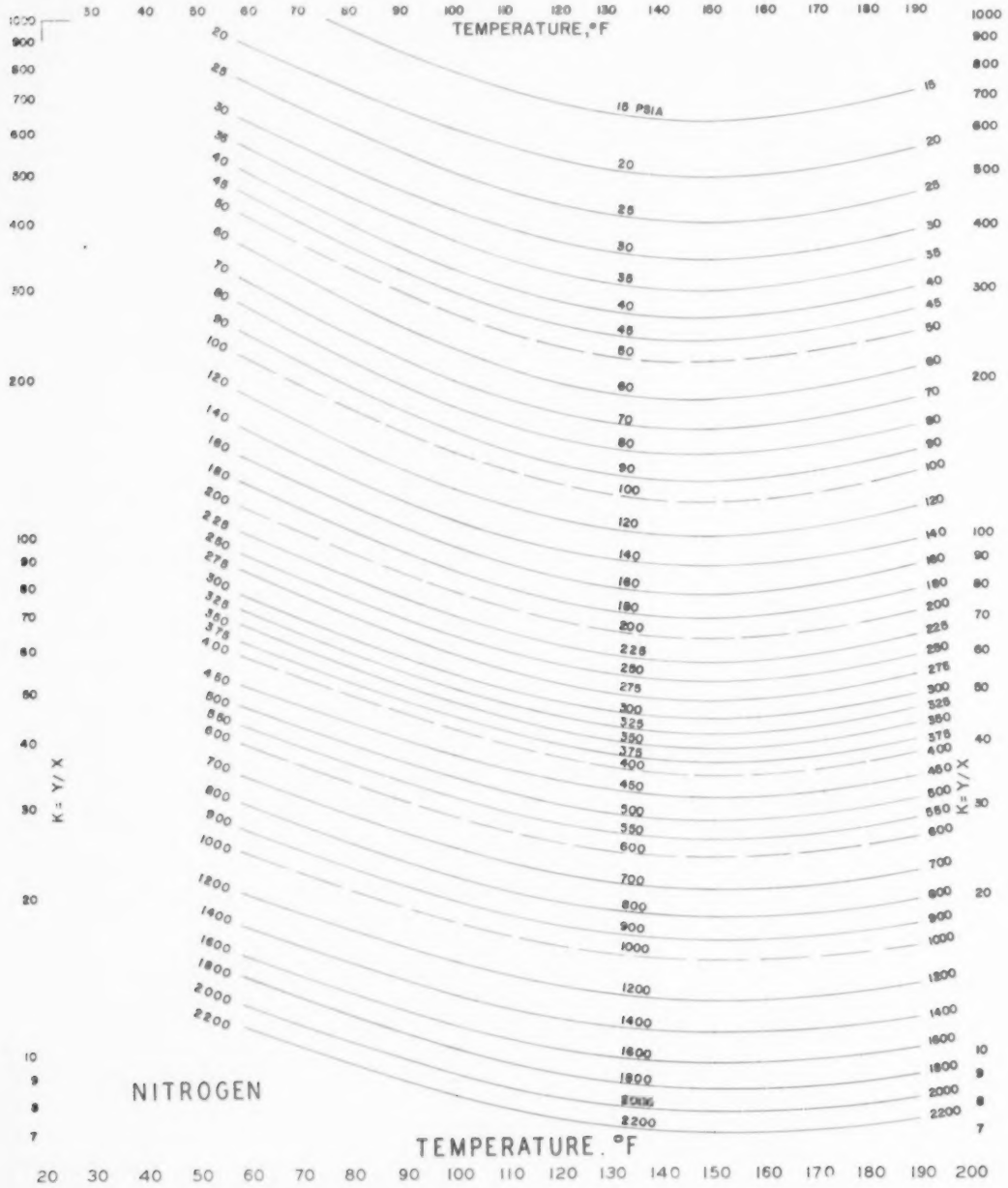
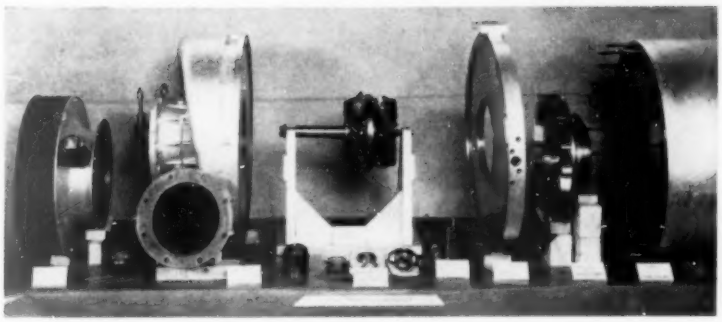
1. Jacoby, R. H., and Rzasa, M. J., J. Pet. Tech., 195, 99-110 (1952).

2. Poettman, F. H., and Katz, D. L., Ind. Eng. Chem. 38, 530 (1946).



Equilibrium constants for nitrogen. Reference: J. Pet. Tech. 195, 99 (1952).



De Laval turbosupercharger designed for high-pressure supercharging service.

Here's a New Turbosupercharger—1

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by Rudolph Birmann

THE course of the development of the diesel engine, from its inception to its present stage, is marked by several distinct milestones.

The early diesel engine aspirated air at atmospheric pressure and employed air injection. Later on solid fuel injection was used, and a continuous rating of 80 psi. b.m.e.p. was obtained.

Exhaust turbine . . . The next major step was the provision of an exhaust-turbine-driven centrifugal blower, to precompress the combustion air to approximately 1.4 atms. The exhaust turbine was of the blow-down type —that is, it was motivated by the pulsating energy of the exhaust gases. Such low-pressure turborsupercharging brought about an improvement in the engine fuel consumption and the greatly increased specific output of 120 psi. b.m.e.p.

Turbosupercharging . . . In recent years the diesel engine entered the era of high-pressure turbosupercharging, employing inlet manifold pressures of 2 to 3 atms. and cooling of air at these pressures. The ultimate possibilities of high-pressure turbosupercharging have not as yet been reached, but at its present stage of development it has already resulted in further improvement of specific fuel consumption and in full-load engine ratings of 180 psi. b.m.e.p. In view of the many advantages with regard to engine performance and operation and specific engine output brought about by high-pressure turbosupercharging, it is rapidly being adopted by the diesel-engine industry, making the original low-pressure supercharging system obsolescent.

In high-pressure turbosupercharging, the energy in the exhaust pulsations no longer is sufficient for driving the turbine, as is the case in low-pressure turbosupercharging. Additional exhaust energy must be made available to the turbine by increasing the pressure in the engine exhaust manifold, from which the turbine is supplied. This means that the engine must operate against a definite exhaust back pressure, and for good engine performance it is essential that the inlet manifold pressure be substantially higher than this exhaust back pressure.

Like low-pressure gas turbine . . . In effect, the turbosupercharger becomes a low-pressure gas turbine, which produces a net output in the form of difference between intake and exhaust manifold pressures, the input being the heat and pressure energy in the engine exhaust gases.

It is well known that in any gas turbine the amount of the net output is very sensitive to the efficiencies of the turbine and compressor. Mediocre or low component efficiencies result in little or no net output of the gas turbine, or, in the case of a high-pressure turbosupercharger, in little or no differential between intake and exhaust manifold pressure, which adversely affects the operation of the engine, particularly with regard to fuel consumption and thermal loading.

High component efficiencies bring about a large difference between intake and exhaust manifold pressures, which has the following effects:

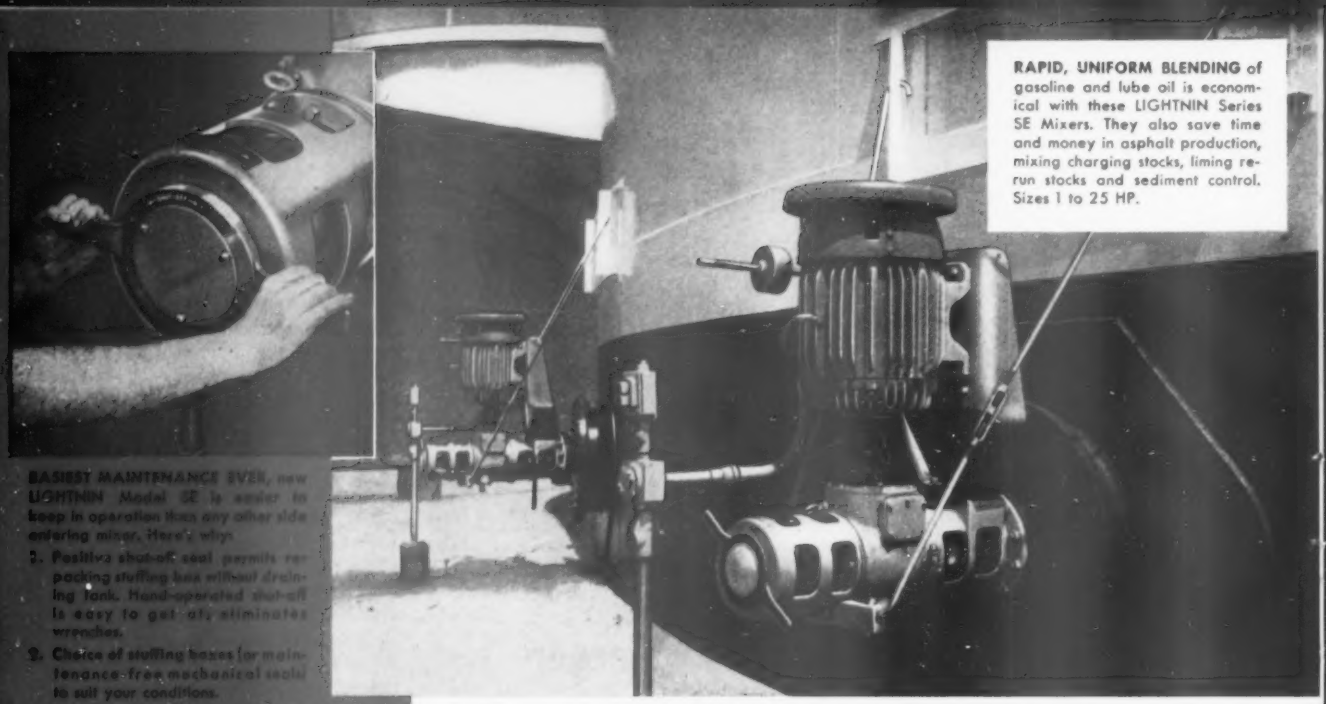
1. During the scavenging period, or, in other words, during the time when both intake and exhaust valves are open, a large flow of air is forced through the engine cylinders.

2. The scavenging airflow brings about internal cooling of the engine.

3. Residual exhaust gases are thoroughly "washed" out of the engine clearance space, thus eliminating the dilution of the fresh air charge by residual exhaust gases, permitting the compression stroke to begin with the minimum possible temperature, which has a favorable effect on the temperature level of the entire internal engine cycle and on its thermal efficiency.

4. The engine indicator diagram circumscribes a positive area during the suction-power stroke, which means that the engine actually develops net horsepower during these strokes — horsepower which represents waste heat (contained in the exhaust), converted into net power output by the turbosupercharger, and transmitted pneumatically therefrom to the engine crankshaft.

Author is research engineer for De Laval Steam Turbine Co., Trenton, N. J.



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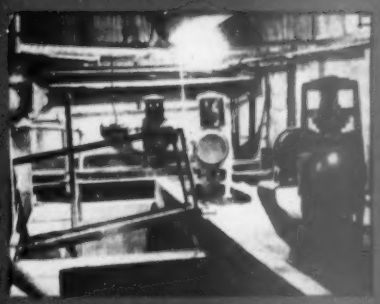

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Control Methods in Boiler Feed-Water Treatment—2

by E. W. Ellis and H. E. Carlson

In Installment No. 1 description was given of the Cities Service Oil Co. treating installation at the East Chicago, Ind., refinery. In this installment a working chart is presented for estimating proper quantities of lime and soda. In later installments analytical methods will be detailed.

For the lime-soda softener, excesses of lime and soda can be calculated from the P and M burette readings (phenolphthalein - methyl purple titration equivalent to the conventional phenolphthalein-methyl orange titration), but proper quantities of these chemicals may be more conveniently controlled by means of the chart shown in Fig. 1. If the P and M alkalinities, calculated as parts per million calcium carbonate intersect within the parallelogram near the center of the chart, the lime and soda excesses will be correct to provide the proper alkalinity in the phosphate softener for efficient removal of residual hardness in the lime-soda effluent. In the extreme upper portions of the parallelogram, on the chart, little or no excess soda ash is indicated.

Authors with Cities Service Oil Co., East Chicago, Ind.

Proper Alkalinity

However, the excess lime is sufficient to provide proper alkalinity for practically complete hardness removal in phosphate softener if 1 to 5 p.p.m. excess phosphate is maintained in the phosphate softener effluent. When there is little or no excess soda ash in the lime-soda effluent, more than normal disodium phosphate is required to provide 1 to 5 p.p.m. excess in the next stage of treatment, but in such cases the final hardness of the feed water is just as low as if 8 to 10 p.p.m. excess soda ash had been provided.

It has been observed that residual hardness in the lime-soda effluent may be reduced to values much lower than 8 to 10 p.p.m. by over-treating to a greater extent with lime and soda, but the phosphate effluent in such cases, which is the boiler feed water, increases to 3 or 4 p.p.m. hardness. These observations show that there is an upper limit to the alkalinity for most efficient phosphate softening. This upper limit has not been determined, but excesses of lime and soda ash as represented by the parallelogram on the chart, are known to represent optimum conditions for precipitating calcium hardness as very insoluble tricalcium phosphate. On the chart it will be noted that any point on the upper diagonal line represents 40 p.p.m. calcium carbonate as excess lime and the lower diagonal 20 p.p.m. When the P and M alkalinities intersect outside the parallelogram, the captions indicate roughly the adjustment in chemical treatment required to correct the condition. Obviously, only directional changes are indicated and final correct conditions can be obtained only by trial.

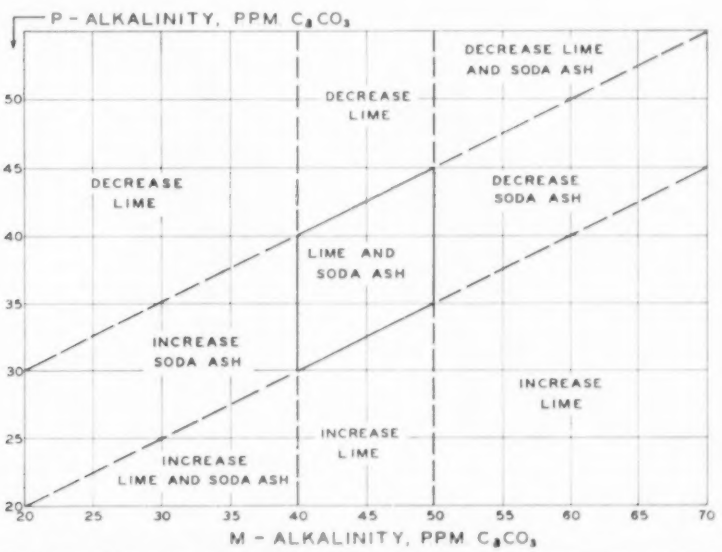

Fig. 1—Addition of proper quantities of lime and soda can be conveniently estimated from this chart.

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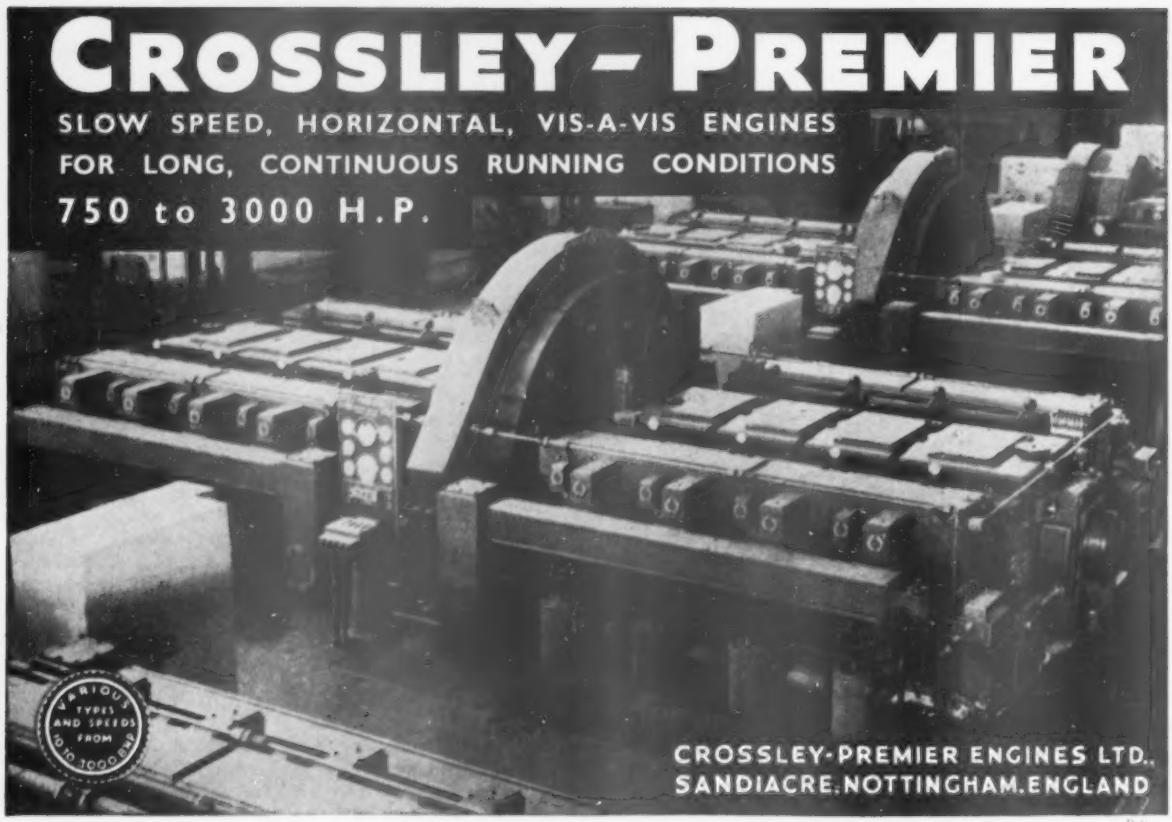

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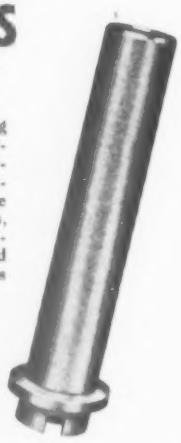

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What Price Complete Refinery Installation?

by W. L. Nelson
Technical Editor

"The cost of refineries seems to vary a lot. Can you direct us to some source of information about the cost of various types of refineries?" S.P.C.

Everyone yearns for a simple foolproof relationship between cost and capacity, not only of refineries but for all manner of simpler installations. In actuality, a single relationship is not only difficult to locate but it should not exist. There are many good reasons for the cost of each plant to be different aside from the capacity or size of the plant or the general process employed—such reasons as (1) kind of oil processed, (2) products needed for the local market, (3) value of land, (4) availability of cheap electrical power or fuel gas, (5) expected life of the refinery venture or even political considerations, (6) time during which crude oil and products must be stored, (7) financial resources of the refinery operator, (8) skill of the management during planning stages, etc.

All of these factors tend to alter the cost of the installation even though the plants being compared are of a single capacity and employ substantially the same types of processing. This is clearly evident in Fig. 1 which indicates that 20,000-bbl. per day refineries can range in cost from $6,700,000 to even $19,000,000 (as of 1946).

In part, this is due to the kinds of processing but a careful inspection of all of the points shown on Fig. 1 indicates that the cost of the most simple common type of 20,000-bbl. per day plant (topping, thermal cracking, and polymerization) should not be much lower (perhaps only $3,500,000) than the most elaborate plant, namely, all common operations including the manufacture of lubricating oils.

A major reason for the wide variation in plant costs is the extremely large part of the refinery cost that is due to nonprocess facilities, such as (1) storage facilities, (2) power or steam generation, (3) roads, dykes, land, etc., (4) maintenance shops, (5) fire-fighting equipment, (6) water systems, and (7) office buildings, laboratories, etc. Such facilities may at the extreme cost only as much as the process equipment, but in some refineries these auxiliary facilities constitute more than 75 per cent of the investment.

In the face of the large variations indicated in Fig. 1, it is clear that dependable refinery costs can only be ascertained by a complete study of the local situation. However, as a means of keeping the proper proportions between the costs of various types of refineries, see lines "A" through "E" of Fig. 1. These were computed by totaling the costs of the various major processing units of the refinery such as (1) topping, (2) thermal cracking, (3) catalytic polymerization, etc., and then adding a factor to account for the cost of all of the auxiliary or service departments of the refinery. It was found that a factor of 750 multiplied by the refinery daily capacity and divided by the total number of barrels actually handled in all of the units (topping, cracking with its recycling, polymerization, dewaxing, solvent treating, etc.) provides a number by which the total plant cost can be computed with fair ac-

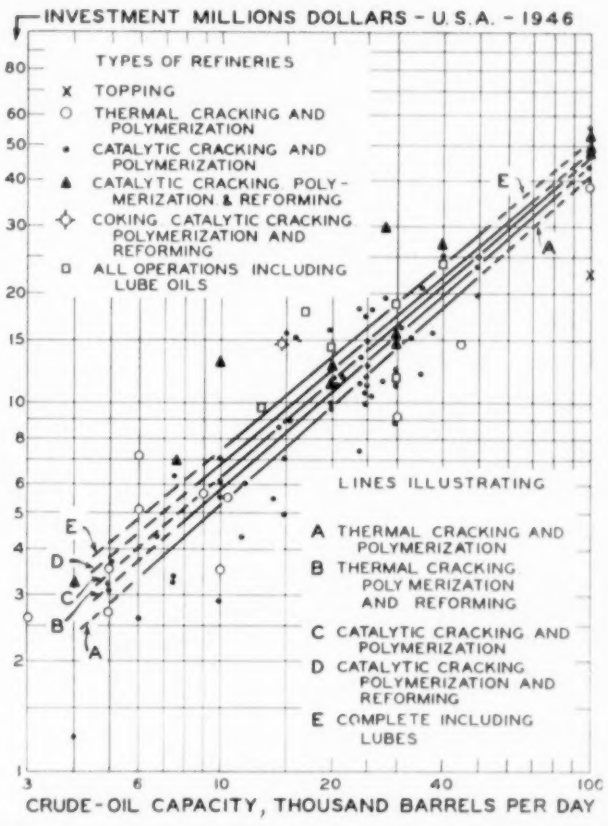

Fig. 1—Approximate costs (1946) of various complete refinery installations.

Questions on Technology (Continued)

curacy. The lines of Fig. 1 were computed by such a method. Note especially that this purely empirical method (i.e. using 750) does not provide the actual cost of auxiliaries, and it should not be considered as a means of obtaining the cost of auxiliary equipment. A theoretically sounder method of computation can be suggested but it requires the use of curves or elaborate computation rather than the single constant (750). The scattering of points on Fig. 1 indicates that the simple empirical correlation is all that is justified.

Example—A 20,000-bbl. per day refinery is to conduct the following operations:

	Daily capacity	Bbls. handled bbl. per day
Topping	20,000	20,000
Vacuum flashing	10,000	10,000
Catalytic cracking	10,000	10,000
Thermal cracking	5,000	10,000
Polymerization	800*	800
Reforming	2,000	2,000
Total barrels handled		52,800

*Product instead of feed.

The costs of auxiliary equipment would be:

$$750 \times \frac{20{,}000}{52{,}800} = \$285/\text{daily barrel}$$

The costs of the various units (Cost-imating issues November 24, 1949 and December 1, 1949 and The Oil and Gas Journal issue September 28, 1950) and the total refinery cost (1946) are:

	$ per bbl.
Topping	$ 440,000
Vacuum flashing	300,000
Catalylic cracking	2,750,000
Thermal cracking	820,000
Polymerization	390,000
Reforming catalytic	800,000
Auxiliaries (20,000 × 285)	5,700,000
1946 total cost	$11,200,000

Sulfur Content of Paraffin-Base Crudes

"What are the sulfur contents of paraffin-base crude oils as compared with other oils?—Wm. S.

Although the industry thinks of paraffin-base crude oils as being low in sulfur, this is due mainly to the relatively high A.P.I. gravity of the paraffin-base oils. When compared on a basis of gravity, the naphthene-base oils are found to contain much less sulfur than other bases of oils, as for 35° A.P.I. crude oils:

	% sulfur
Naphthene base	0.10
Intermediate base	0.33
Paraffin base	0.54

or for a gravity of 45° A.P.I.:

	% sulfur
Intermediate base	0.10
Paraffin base	0.19

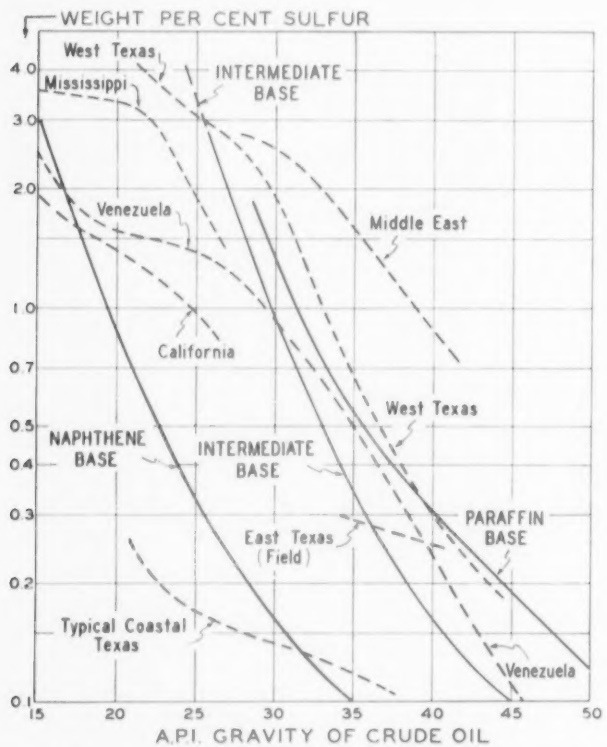

Fig. 1—Comparison of the sulfur content of paraffin-base, intermediate-base, and naphthene-base crude oils.

These general relationships are indicated in Fig. 1, which is based on the 283 largest fields in the United States *(Questions on Technology, April 20; April 27, and May 4, 1950)* with respect to the sulfur content of various bases of crude oils and on the general tabulation of the sulfur content of oils from various regions of the United States and world that was published in the May 9, 1952, issue of Questions on Technology.

Thus, gravity rather than base of oil is the main variable with respect to sulfur content. Typical oils of each base contain somewhat the following percentages of sulfur:

	A.P.I.	% sulfur
Naphthene base	24	0.39
Intermediate base	36	0.29
Paraffin base	42	0.25

Variations are large among paraffinic oils:

	A.P.I.	Gasoline (%)	Sulfur (%)
All paraffinic oils	38.1	27.7	0.38
Without Van and Pecos counties (Texas)	39.3	28.4	0.20
Van and Pecos counties	32.7	24.8	1.19
Pennsylvania only	41.5	31.0	0.10

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EQUIPMENT MEN . . . in the News

Guiberson Completes Laboratory, Engineering Building

Completion of an extensive and highly specialized laboratory and engineering building has just been announced by Gordon G. Guiberson, president of The Guiberson Corp. Augmenting Guiberson's oil-tool research and laboratory and field testing, it will result in important benefits to the industry.

"The testing and research that is being done in the new laboratory will give field men quicker, more reliable answers to their problems," Guiberson stated in discussing the new facilities.

Most outstanding fact of the building is the new hydraulic testing laboratory. Here, in the words of Tom Losey, Guiberson chief engineer, "A wide variety of field conditions have been brought right into the lab."

The laboratory extends the full height of the two-story building and down into the 8-ft. well cellar—a total head room of 32 ft. This allows use of strings of tubing, casing, and drill pipe to simulate working field conditions and give on-the-spot analysis, checking, and testing.

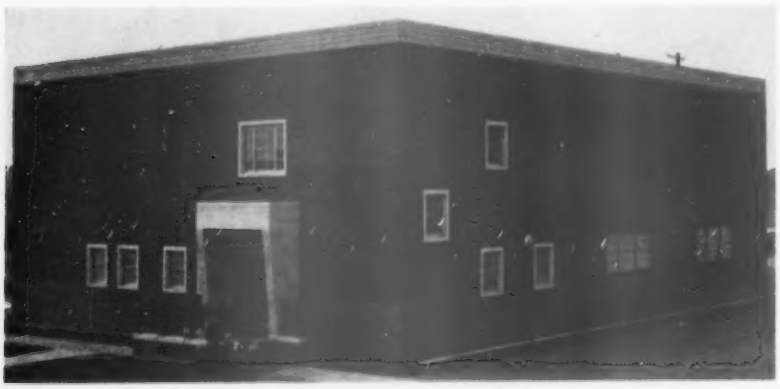
Real testing and experimentation are also made possible by three cased test holes, installed right in the laboratory. This allows engineers to run swabs and set packers and anchors as though they were at the well location, since hydraulic high-pressure equipment has been installed to provide the same high pressures encountered in field operation. An autoclave, for applying extremely high pressure and temperature conditions, will provide testing pressures up to 15,000 psi. and temperatures up to 350° F.

Also in the new building is a completely modern drafting room, opening directly into the laboratory. A central print file is located in the center of the room to give quick availability of prints on all current Guiberson tools and parts for immediate answers to questions from field operators.

In the hydraulic testing laboratory, two Guiberson engineers record data at the beginning of a bookwall packer test in the high-pressure testing fixture. Flange on the fixture, when studs are installed, will handle test pressures up to 10,000 psi. At left, Guiberson experimental swab is ready to run in deep cased test holes for preliminary testing. Temperatures in excess of 300° F. can be applied to this hole by a jacket for circulating hot fluids. Both pulling unit and pressure equipment simulate field swabbing conditions.

Another feature of the new building is a spacious conference room, seating more than 100 people.

Two other service departments are housed in this large engineering building. One is the library, containing complete files of oil-equipment magazines, equipment catalogs, reference books, and patent-office gazettes. The other department is the blue-print room, containing a 48-in. printing unit, plus a fireproof vault where 25,000 original drawings are filed.



Guiberson Corp.'s new 12,000-sq.-ft. completely air-conditioned engineering building and hydraulic testing laboratory just completed in Dallas.

McMurray Is New Sales Manager for Master Tank

A. V. McMURRAY

A. V. McMurray has been promoted to sales manager of Master Tank & Welding, Dallas, according to an announcement by Sam O. Weempe, owner. McMurray will be in charge of sales to all divisions of the industry where Master products are used, which includes refineries, L.P.-gas, transportation, storage, and pipe lines.

McMurray has been with the firm since 1948 and has been in the sales department of the pipe division. McMurray has been associated with the petroleum industry since 1927.

Holt Named Oklahoma District Field Engineer

CLEVE HOLT

Appointment of Cleve Holt, Jr., as Oklahoma district field engineer for Security Engineering has been announced by A. M. Birnie, general sales manager for Security. Already working at his new position, Holt will spend the majority of his time contacting drillers and tool pushers, to assist them with drilling problems.

Bowman Joins New York Office of Ralph M. Parsons

T. P. BOWMAN

Thomas P. Bowman has joined The Ralph M. Parsons Co. as an assistant to Harry P. Broom, vice president in charge of Parsons' New York office. For the past 8 years Bowman was associated with Foster Wheeler Corp. as a project engineer on oil-refinery and chemical-plant work.

Bank of Montreal Names Richards Representative

J. A. Richards, attached to the Bank of Montreal's superintendent's department, Calgary, for the past 2 years, has been appointed special representative in Calgary. He will be in charge of the bank's business development in the oil fields of Alberta.

Richards joined the Bank of Montreal in Edmonton in 1929. Since that time he has spent most of his banking career in Alberta.

Eastling Appointed General Manager by Link-Belt Co.

H. V. EASTLING

Link - Belt Co. has announced the appointment of Harvey V. Eastling as general manager of the company's Pacific division, with headquarters in San Francisco. He succeeds Ralph M. Hoffman, who is retiring after 40 years of service.

Eastling, who has been assistant general manager of the Link-Belt Pacific division since June 1, started his Link-Belt career in 1925 as chief draftsman at the San Francisco plant. He later became chief engineer of Link-Belt Co. Pacific division and subsequently manager of engineering sales in Seattle. In 1940 he was appointed general sales manager of the Pacific division.

American Meter Adds Two New Sales Engineers

American Meter Co., manufacturers of precision control instruments, has announced the appointment of William

W. N. DONACHY

ANDREW SESOCK

N. Donachy and Andrew Sesock to its sales-engineering organization.

Donachy joined American Meter as a student in its sales training program after 10 years with the natural-gas industry in the Southwest. During this period he was associated with Arkansas-Louisiana Gas Co. as meter inspector and the Muscle Shoals Natural Gas Co. as a meter supervisor. His new territorial assignment covers southern Kansas, western Arkansas, and Oklahoma.

Sesock became associated with American Meter in 1951 as a sales engineer in the Tulsa district. His new appointment as a sales representative is to the Billings, Mont., district.

Oilwell Changes Gulf Coast Organization

Oil Well Supply Co.'s new warehouse at Houston.

Important organizational changes in the Gulf Coast area of Oil Well Supply division of United States Steel Corp. have been announced by W. F. Jones, area manager.

A new building at Houston will house the area warehouse and part of the area office personnel. The new Oilwell facility will operate under direct supervision of the area office, according to Jones, and will not only serve the industry operations around Houston, and back up other stores in the Gulf Coast with heavier stocks, but will also provide access to Gulf Coast manufacturers' stocks through a buyer who will office at this location. Teletype service from Gulf Coast stores will provide quick contact with the area warehouse.

"District lines also are being revised to conform more closely with petroleum industry requirements. In place of three districts at present, we will have two districts," Jones said.

One of the districts will headquarter at New Orleans and be known as the Southeast Texas-South Louisiana and

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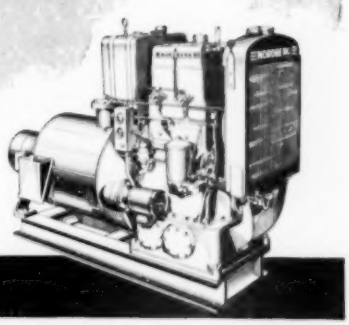
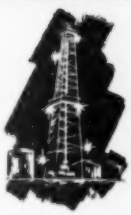


IN RIG LIGHTING

Nordberg "4FS" Diesel generator sets deliver low cost power for rig lighting, stand-by refinery service, portable emergency light plants. They produce from 6 to 30 K.W. in all standard A.C. and D.C. voltages.



IN MICRO-WAVE RADIO COMMUNICATIONS

Nordberg "4FS" generator sets also provide low cost power for both stand-by and main power source for micro-wave pipe line radio communication systems.

IN PRODUCTION PUMPING

Nordberg "4FS" Diesels with clutch power drives are a "natural" for powering single or multiple production pumping units. They deliver 10 to 45 H.P. at medium speed for around-the-clock service.

You can cut costs three ways with Nordberg "4FS" Diesel engines because they are *low in initial cost, low in operating costs* and *low in maintenance costs.* They are available as 1, 2 and 3 cylinder units.

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Mississippi district. It will include Beaumont, Tex., and Brookhaven, Miss.; and Eunice, Harvey, Lake Charles, New Iberia, and Thibodaux, La., stores.

The other district will headquarter at San Antonio, and will continue to be known as the Southwest Texas district. It will include Texas stores at Alice, Corpus Christi, Freer, Mirando City, Mission, Pettus, and Victoria.

D. O. Smith, assistant area manager, will resume direct responsibility for coordinating all activities of the area warehouse, Houston store, and Oilwell's metropolitan Houston sales activity.

B. A. August will continue to be district manager of the Southwest Texas district with headquarters at San Antonio. L. D. Kinnan has been appointed assistant district manager of this district and will headquarter at Alice.

H. W. Solsberry has been appointed district manager of the new Southwest Texas-South Louisiana and Mississippi district and will continue to headquarter at New Orleans. H. B. Tracy has been appointed assistant district manager of this new district and will headquarter at Lake Charles.

R. A. Miesch has been appointed area merchandise manager and will be responsible for inventory administration and procurement in the Gulf Coast area.

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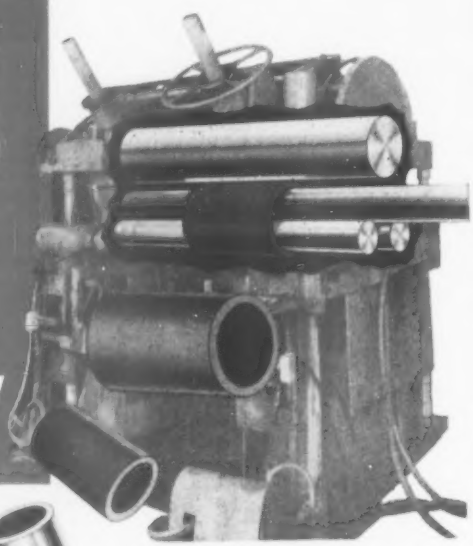

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T.I.-G.S.I. Completes Plant Expansion Program

J. E. Jonsson, president of Texas Instruments, Inc., and C. H. Green, president of Geophysical Service, Inc., congratulate each other during the mid-November open house which marked the completion of the recent T.I.-G.S.I. plant-expansion program. Located at Dallas, the plant now has nearly 200,000 sq. ft. of plant area devoted to the manufacture of precision geophysical, electromechanical, and electronic equipment.

Wagner Joins Staff of C-R-C Engineering Co.

W. E. WAGNER

William E. Wagner has joined the staff of C-R-C Engineering Co., Herbert E. Fisher, managing director, has announced. Wagner has been with C-R-C Supply Division for the last 9 months.

Wagner was graduated from Cooper Union Institute in 1937. Before joining C-R-C, he was associated with Charles Wheatley Co., of Tulsa, for 6 years, serving as salesman and branch manager in Oklahoma City and Dallas.

Edward Soph Co. Names Haynes Head Tulsa Office

According to Edward Soph, of The Edward Soph Co., manufacturer's representatives handling corrosion-resistant equipment and materials, Richard E. (Dick) Haynes has recently joined Soph and has been put in charge of the company's Tulsa office.

Haynes joined Soph directly from his position in the materials division of the Petroleum Administration for Defense. A graduate of University of Tulsa, Haynes has served in an engineering capacity with Shell Oil Co.,

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Carter Oil Co., War Production Board, A. O. Smith Corp., Edward Falck Co., and as consulting engineer in Washington, D. C.

Edward J. (Bing) Soph, has been moved to Houston.

Knight-Gordon Named By Superior Combustion

Superior Combustion Industries, Inc., manufacturers of Superior heat exchangers, has announced the appointment of Knight-Gordon Engineering (Art Knight and Milt Gordon) of Tulsa, as its representatives in the states of Oklahoma and Kansas. Superior Combustion Industries, Inc., executive offices are in New York City, and its plant in Emmaus, Pa. Superior heat exchangers are employed for heating, cooling, condensing, and evaporating, with applications in the petroleum and petrochemical field.

Smith Given Sales Post by Associated Oil Field Rentals

C. A. SMITH

Chester A. Smith has recently joined Associated Oil Field Rentals, Houston, as sales representative, according to an announcement by J. O. Dorroh, vice president.

Smith is a graduate of Oklahoma A. & M. where he majored in petroleum engineering. Before joining Associated Oil Field Rentals, he was sales representative for Byron Jackson Co. Smith's headquarters will be in Houston.

Continental Names Davis To Managerial Sales Post

Jack A. Davis, manager of Continental Supply Co.'s pipe-line-equipment division for over 7 years, has been named manager, tubular sales, for the firm's Oklahoma-Kansas division, with headquarters in Tulsa. R. E. (Dick) Scheibel has been appointed to succeed Davis in the company's home office in Dallas.

Davis has been with Continental for 20 years. Before moving to Dallas, he served as field salesman in East Texas and later as city salesman in Fort Worth.

Scheibel joined Continental in 1946. He formerly was store manager at Eunice and Lake Charles, La., and refinery salesman at Lake Charles.

Executive, Field Personnel Attend Seismograph Meet

The twenty-second annual Seismograph Service Corp. party chiefs' and supervisors' meeting recently held in Tulsa was attended by executive and field personnel. G. H. Westby, Seismograph president, was presented with a 20-year service pin. Reports of the company's activities, both foreign and domestic, for the past year and its plans for the future were given at the meeting. Lorac Service Corp., an S.S.C. subsidiary, reported substantial expansion of its Gulf Coast positioning networks will soon blanket the offshore area from Alabama to Mexico. Attending the meeting were, front row: H. S. Jennings; J. R. Blaisdell; H. H. Andrews; R. S. Fischer; J. E. Hawkins, vice president; G. H. Westby, president; A. J. Bartholmes, executive vice president; H. M. Thralls, vice president; F. B. Leedy, treasurer; J. L. Hull, secretary and general counselor; R. S. Finn, vice president; J. L. Gartner, and S. W. Wilcox. Second row: R. E. McMillen; H. R. Breck; R. W. Mossman; M. E. Putnam; G. H. Carlson; R. W. Baltosser; R. B. Baum; C. E. McClure; E. A. Langpaul; W. H. Van Horn; C. W. Dow; J. W. Hammond; A. M. House; J. B. Rogers, and W. O. Heap. Third row: L. R. Earl; C. L. Bury; T. H. Evans; H. J. Lins; A. H. Manhart; W. K. Litson; F. I. Garrette; R. B. McCaskill; M. G. Steil; S. W. Schoellhorn; E. H. Kurk; J. A. Ries; S. W. Fruehling; J. N. Wilson; J. C. Dougherty; R. L. Whitaker; H. L. Richardson; L. G. Cornish; R. W. Saubert, and B. W. Koeppel. Back row: J. G. Jackson; C. C. Smith; D. W. Cochrane; E. D. Wilson; R. K. Finley; B. F. Nally; W. B. Garrison; C. V. Hussey; W. R. Holford; G. W. Hall; Van Roberts; R. G. Carlton; P. D. McCalman, and A. A. Milton.

Spang-Chalfant Official Receives Kelly Award

J. L. Holmquist, director of research, Spang-Chalfant division of The National Supply Co., Ambridge, Pa., was honored recently for work directed toward improvements in the manufacture of oil-well drill pipe, well tubing, casing and other oil-country tubular products.

The Association of Iron and Steel Engineers presented Holmquist with the Kelly award at its recent annual meeting in Pittsburgh in recognition of his paper describing an "Investigation of the Displacement of Material in the Mannesmann Piercing Process by Means of Model Wax Billets." This process is used in the manufacture of oil-country tubular products.

Schneller to Head Welding Sales for A. O. Smith

SCHNELLER

A. R. Schneller has been appointed manager of welding sales for the Pacific Coast region by the Welding Products division of A. O. Smith Corp., according to John W. Spoor, general sales manager. He had previously been responsible for welding sales in Wisconsin.

Earlier in 1953 Schneller won the "Oscar" of the Sales Executive Club of Chicago.

"We had to make certain about desalting—

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Refiners throughout the world consult Howe-Baker about emulsion problems. In fact, on 3 continents more than 1,000,000 barrels of crude oil per day are being treated by custom built electrostatic units designed by Howe-Baker. Call us for a detailed discussion of your particular requirements.

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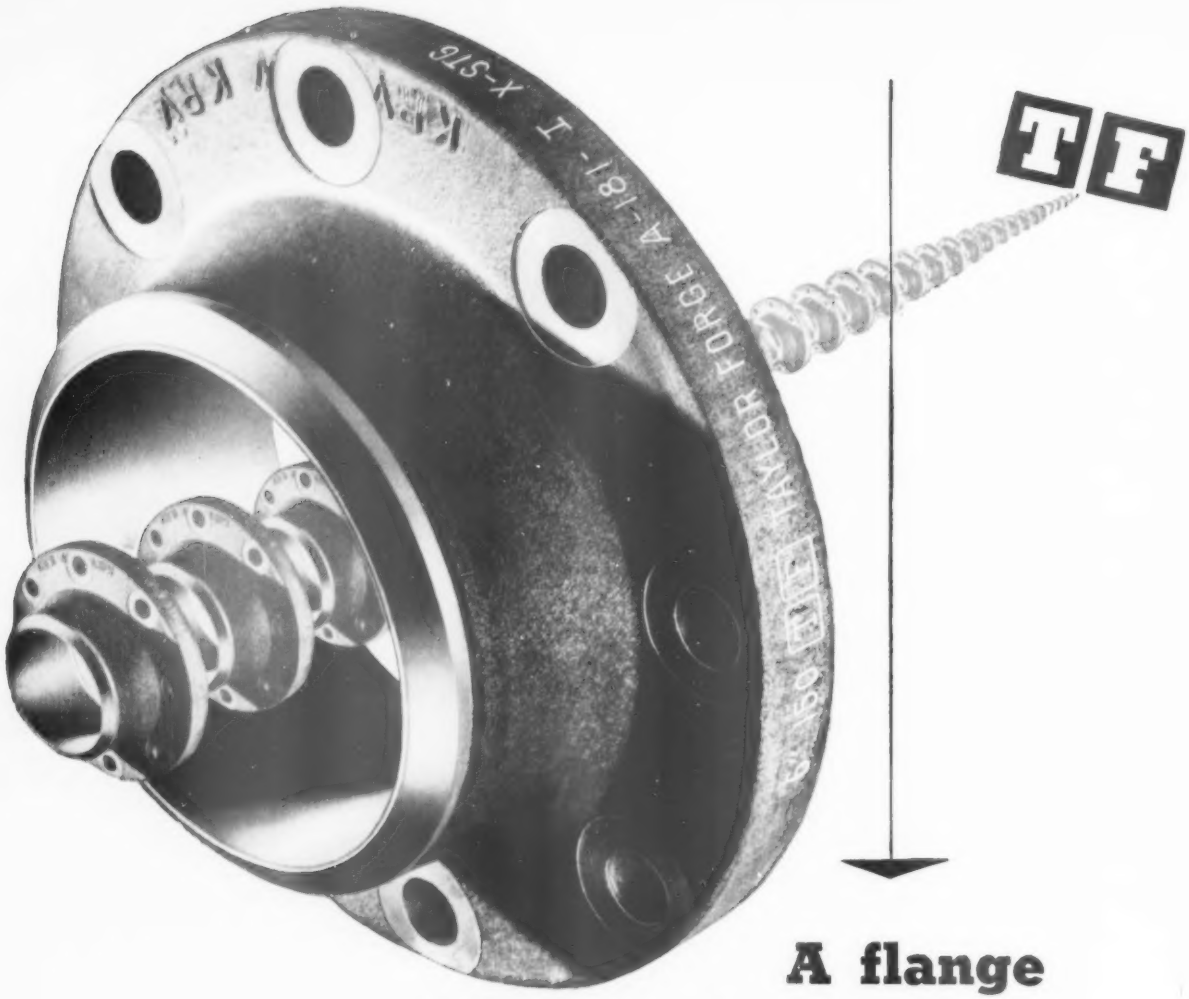

A flange with a background...

You are looking at a flange with a history. Taylor Forge made the forged steel flange and in a sense the forged steel flange made Taylor Forge. It was Taylor Forge, back in 1905, who made the first forged steel flanges on a commercial scale . . . and it is Taylor Forge who has guided flange development across the past half century.

Through the first threaded flange form, the bolted Van Stone form, and the perfected welding neck form pictured here, Taylor Forge has undeniably contributed more to flange development than any other organization*.

Taylor Forge Welding Neck Flanges are a part of the WeldELL® line—the line that more than 20 years ago gave industry the first complete line of fittings for pipe welding. The organization that led development is still leading . . . in scope of types, sizes, weights, materials . . . in quality and downright value!

For up-to-the-minute facts see your Taylor Forge Distributor

TAYLOR FORGE

TAYLOR FORGE & PIPE WORKS, General Offices & Works: P.O. Box 485, Chicago 90

Plants at: Carnegie, Pa., Fontana, Calif., Gary, Ind., Hamilton, Ont., Canada

* When pressures rose from the old 150- and 300-pound standards to 400, 600 and finally 900 pounds, it was largely the exhaustive research of Taylor Forge that supplied the formulas for determining stresses in flanges for any given condition of loading. Among many examples: the Taylor-Waters formula, published in 1927, became and still is the basis of recognized practice for flanges in sizes through 24". Again, in 1938 Taylor Forge published the first edition of the now authoritative "Modern Flange Design" based on methods proposed by E. O. Waters, D. B. Rossheim, D. B. Wesstrom and F. S. G. Williams, Taylor Forge Manager of Engineering Standards. (ASME Trans., Apr. 1937)

DIGEST OF NEW EQUIPMENT

IT'S NEW — CHECK IT

TRADE LITERATURE

1 JET CUTTER. A new, four-page technical bulletin describes a special tool for fragmentizing junk and lost tools in a well. Time-saving and money-saving features of these explosive, electric wire-line jet cutting tools are fully described and illustrated. Actual field reports showing the many uses, applications, and successful job accomplishments are included. Operation and detailed specifications are also given. *McCullough Tool Co.*

2 NEW FULL-LINE HOIST CATALOG. A condensed, full-line, eight-page catalog, printed in two colors, contains illustrations, descriptions, and specifications for over 100 different types and sizes of portable hoists. Among the units described are ratchet lever hoists, both roller and coil-chain models; with capacities from ¾ to 15 tons; a complete line of standard and specialized spur gear hoists; Quik-Lift electric hoists; versatile, all-purpose Hoist-Alls, Mighty Midget pullers designed to hang on a tool belt; and a wide variety of utility maintenance tools. *Coffing Hoist Co.*

3 CONSTRUCTION BROCHURE. A 24-page brochure covering engineering and construction activities in the petroleum, chemical, and petrochemical fields contains photos and descriptive material on gasoline plants, refineries, petrochemical process plants, catalytic cracking units, and compressor stations. The various applications of cooling towers, air-cooled heat exchangers, heavy-duty mufflers, pulsation dampeners, and gas cleaners in petroleum and petrochemical process plants are illustrated. *Fluor Corp.*

4 REPUBLIC PLASTIC PIPE is a 12-page, 2-color letter-press booklet with 3-color offset cover. It tells why Republic entered the plastic-pipe field, describes the two principal types of plastic pipe made, shows how to join plastic pipe, and lists various engineering and corrosion data. *Republic Steel Corp.*

5 ALUMINUM-JACKETED FOAMGLAS PIPE INSULATION. The bulletin points out the advantages of the aluminum wrapped-at-the-factory cellular glass insulation. In addition to describing the economics made possible by the new aluminum jacket, illustrated condensed specifications for the insulation of both hot and cold lines are presented. *Pittsburgh Corning Corp.*

6 BRODIE BIROTOR MEASURING UNITS. Pipe-line-metering Bulletin No. 634 illustrates the meter with replaceable measuring unit. Cutaway illustrations show the two moving parts in the measuring chamber and the principle of no-metal-to-metal contact. The completely self-contained and readily interchangeable measuring unit permits quick change-over, inspection, and servicing without disturbing meter housing or line connections. *Ralph N. Brodie Co., Inc.*

7 WHAT'S THE DIFFERENCE IN WIRE ROPE? A new brochure available from Leschen answers questions which may be in the minds of wire-rope buyers. It explains differences in the selection of wire going into various rope, and differences in manufacturing processes. *Leschen Wire Rope Division, H. K. Porter Co., Inc.*

8 METAL AT WORK, is a comprehensive study of the products and production methods of the seven divisions of Continental Copper & Steel Industries, Inc. Documented by countless step-by-step operational photo-

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Corresponding to new equipment items or trade literature abstracts in the Oil and Gas Equipment Digest of The Oil and Gas Journal, Nov. 23, 1953

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graphs, the book takes the reader through the plants of Alloy Fabricators Division, Braeburn Alloy Steel Division, Hanover Wire Cloth Division, Niagara Falls Smelting & Refining Division, Hatfield Wire & Cable Division, Walsh Holyoke Boiler Works Division, and the Welin Davit and Boat Division. The manufacturing processes of each unit are described and explained in detail as the reader follows products through complete production cycles. *Continental Copper & Steel Industries, Inc.*

9 BULLETIN ON PRESSURE PLUGS. Heat-treated precision plugs, which seal tight without sealing compound by crushing crests and roots in softer threads of mating tapped parts, are discussed in a new bulletin. The alloy-steel product whose rolled-on threads have a strong continuous grain structure gives a positive seal against either liquids or gases under pressure. Spiral leakage is eliminated. In pictures, drawings, and text, bulletin describes sealing operation of the threads. The standard Unbrako plug sizes are listed. *Standard Pressed Steel Co.*

10 STATEMENT OF SCOPE. This 12-page, pocket-size booklet is presented for convenient reference to Wolverine Tube Division products, its range of size, lengths, and tempers available as well as a complete scope of facilities. Also featured are listings of individual product literature available, and locations of Wolverine sales offices and plants. *Wolverine Tube Division.*

11 NORDSTROM MULTIPORT CHART is a handy desk-size flexible plastic chart showing the port and stop arrangements of Nordstrom multiport valves. The front of the chart offers diagrammatical sketches of four types of multiport valves, each with a revolving two-color plastic disk attached to the center to illustrate the fluid traffic control obtained in the various types of multiport valves. The rear of the chart illustrates with smaller diagrammatical sketches the numerous other positions possible with different multiport arrangements. *Rockwell Manufacturing Co.*

12 DYNAMIC FLOW CONTROL introducing the Model 59 valve-mounted controller for high-speed flow-control applications. The new eight-page Bulletin 470 covers a typical flow-control system, dividing it into its four components: the M/59 controller; the set-point transmitter (M/53 recorder); the measurement transmitter (Foxboro d/p Cell); and the Foxboro Stabilflo control valve. A two-page explanation of the M/59 Controller mechanism centers on the provisions for proportional, derivative, and reset control actions. *The Foxboro Co.*

13 NEW EXPANSION-JOINT BULLETIN. An illustrated eight-page bulletin describes the Flexon line of expansion joints. Bulletin presents all basic data necessary to the proper selection and application of pipe-line expansion joints. Highlights of the bulletin include a discussion of types of pipe-line motion frequently encountered, and methods of handling this motion. Also covered are complete specifications for low and high-pressure units, and detailed information on special types of joints. *Flexonics Corp.*

14 ROD SELECTOR CHART. A new chart of welding rods, printed in three colors and arranged for ready reference to assist in the selection of the proper welding alloy for the specific job, lists over 160 different Eutectic low-temperature welding alloys, their bonding points, tip colors, and tensile strengths, classified by type of metal and further subdivided by arc or torch applications. A brief description of the main uses for each rod and electrode gives the user instant reference material to assist in most efficient usage of the materials listed. *Eutectic Welding Alloys Corp.*

15 THE ANSWER TO OIL-INDUSTRY SCALE AND DEPOSITION PROBLEMS. These water and fluid conditioners are reported to remove and prevent scale; and reduce corrosion in water or fluid systems. It improves drilling muds, making them easier to control; and increases the effectiveness of additives, often effecting substantial savings in chemical costs. Evis conditioned crude oil often responds to treatment with appreciable savings in chemicals. *Evis Manufacturing Co.*

FOR MORE INFORMATION . . . . use one of these cards.

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Corresponding to new equipment items or trade literature abstracts in the Oil and Gas Equipment Digest of The Oil and Gas Journal, Nov. 23, 1953

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DIGEST OF NEW EQUIPMENT

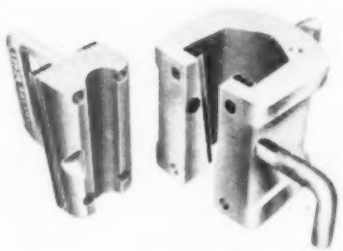
IT'S NEW ✓ CHECK IT

by Dan B. Miller

16 AMERICAN HAMMERED CONFORMABLE OIL RING, specifically designed for industrial use, insures constant unit pressure for positive oil control. These rings have a very flexible cast-iron member that is relatively thin in cross-section and conforms readily to meet cylinder distortion. Ring member has a wide channel around its outside face with a series of slots extending inwardly from channel to an internal groove with a rounded base in which fits a coiled steel spring abutment type expander. When the ring is closed to cylinder size, the spring is compressed and thus exerts uniform radial pressure around the entire circumference of the ring. Narrow bearing surfaces on either side of the channel give the ring a high unit pressure on the cylinder, enabling it to seat promptly and assuring maximum removal of excess oil. Practically uniform pressure is exerted throughout the life of the ring and the spring cannot damage the grooves. *Koppers Co., Inc., Metal Products Division.*

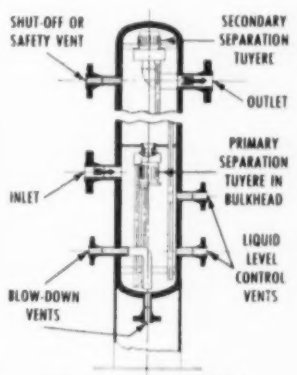
IT'S NEW ✓ CHECK IT

17 QUICK-CHANGE CAVINS-BENNY POLISHED-ROD CLAMP is a wedge type that is installed or removed in a matter of seconds. The clamp grips the polished rod quickly and positively as the weight of the rods tightens the tapered wedge into position in the body. No beating or hammering is necessary to place this clamp in position on the rod. Wrenches or snipes are not required. To remove the rod clamp is only a matter of relieving the load and lifting the wedge. For permanent installation as a pumping clamp a set screw is used to secure the wedge in the body, and is used with rod rotators by removing the handles. Complete clamp weighs 22 lb., is made of heat-treated steel, and has an A.P.I. rating of 25,000 lb. at a 2 to 1 factor. One clamp body fits all sizes of polished rods from 1 to 1 1/2-in. diameter, with individual wedges for each size of rod. *The Cavins Co.*



IT'S NEW ✓ CHECK IT

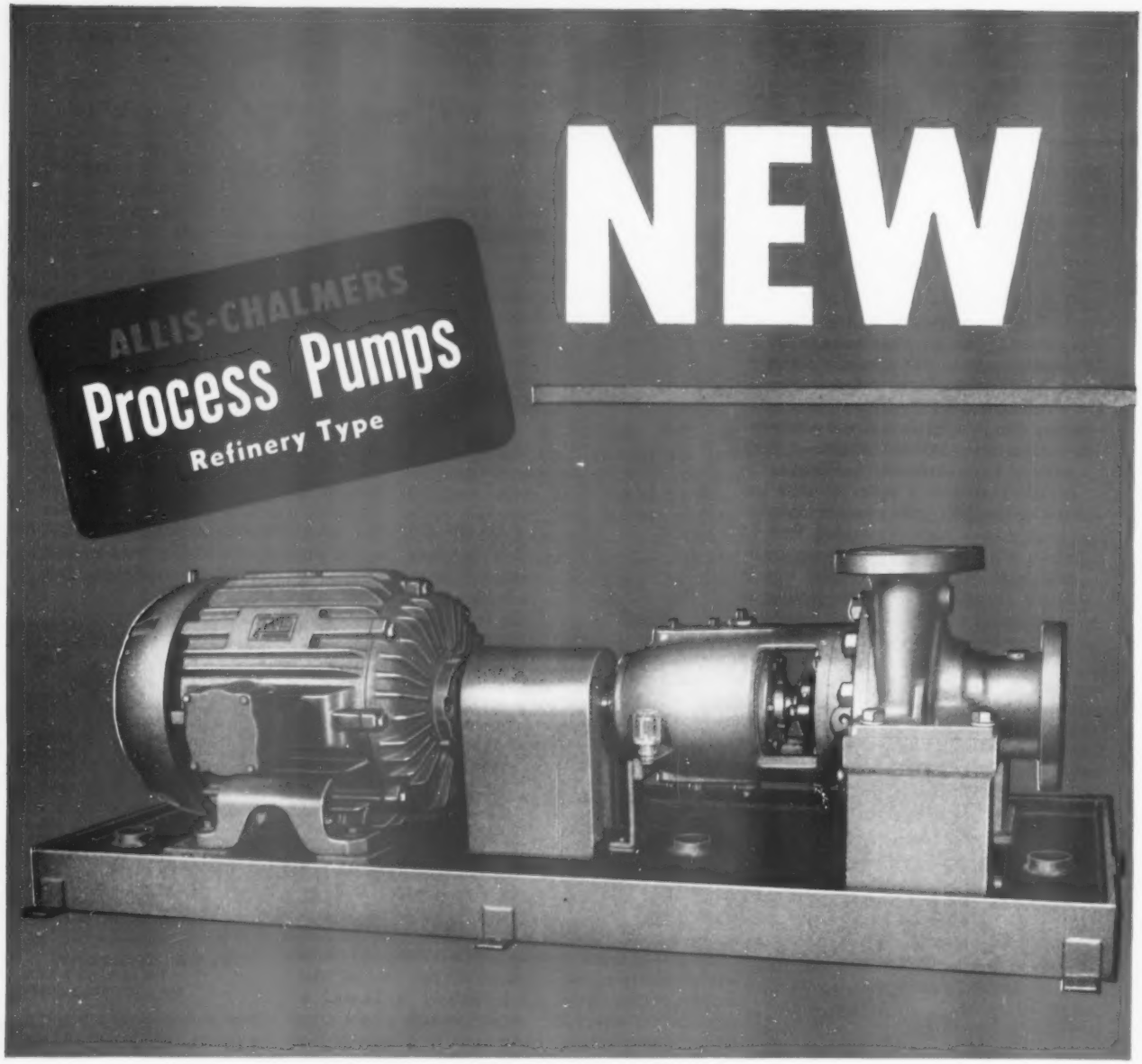
18 OIL-GAS SEPARATOR. Oil-gas separation with efficiencies of 100 per cent (99.5 to 99.9) is now being done by means of dual centrifugal tuyere design. Design adaptations permit use of the two-stage unit on distillation - vessel outlets, also in gas lines. The units may be employed in refineries, at well heads, or pumping stations to remove gas from oil or to separate oil from gas. The unit consists of an all-welded cylindrical A.S.M.E. - approved pressure chamber located in vertical position. The vessel contains a bulkhead in which an upflow-type primary separating tuyere is located. Above the bulk head at the top of the chamber is located a downflow-type tuyere which affects second-stage separation. An eject tube extends from the tuyere race down through the bulkhead to below liquid level in the bottom primary chamber. Liquid-level control in the primary chamber is achieved by means of two flanged pipe vents. These are located on separate levels to afford liquid-level control depending on working pressure of the still or line. Blowdown connections at side and bottom permit removal of silt and sediment either continuously or intermittently. Final separation is achieved in the upper portion of the vessel. The gas passes through the downflow tuyere where residual entrainment is extracted and returned to the lower chamber by means of the eject tube. The units may be designed to



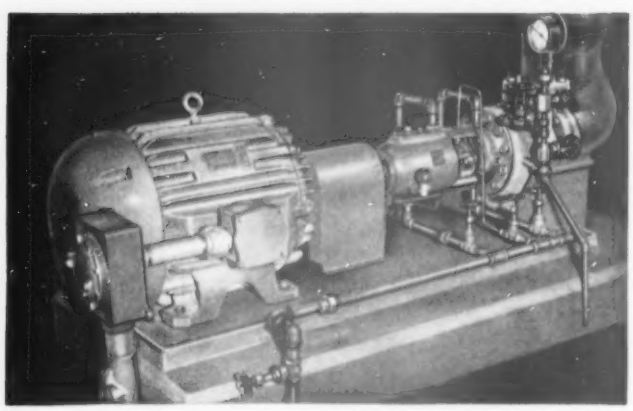
OIL-GAS SEPARATOR

KEEP INFORMED ✓SAVE TIME ✓TEAR OUT CARD ✓CHECK IT ✓MAIL IT

This Digest of New Equipment offers you a quick resume of important features of new or improved products and trade literature and the opportunity to obtain complete information on each subject by use of the convenient "CHECK IT - MAIL IT" service card.



Easy Installation and Maintenance



All Allis-Chalmers Type R pumps are furnished with spacer-type couplings. This type of coupling permits the pump to be disconnected from the driver and the entire rotating element — bearing bracket, shaft and impeller — removed without disturbing either the piping or the driver. This type of assembly permits quick examination of the pump, simplifies repairs or replacements and keeps downtime of the unit to a minimum.

In addition, two sets of bearing bracket assemblies fit the complete range of pump sizes. Since parts for only two sizes of bearing brackets are required, regardless of the number of pumps operated, parts inventories are greatly reduced. All bearing bracket parts of R-9 pumps are interchangeable and all R-12s are interchangeable. Where continuous operation is vital, a complete spare assembly can be kept on hand and replaced very quickly.

Refinery Pump

- ☆ **Specially designed for high temperature operation**
- ☆ **Choice of materials and stuffing box arrangements**
- ☆ **Ample provision for cooling**

HERE IS AN ENTIRELY NEW refinery-type pump. It has every feature designed for continuous trouble-free service and to keep your process pumping costs low.

Sealing Arrangement

When the standard stuffing box is used, it carries an adequate amount of packing plus a seal cage. A mechanical seal is interchangeable with the packing. No machining required. A seal plus auxiliary stuffing box may be installed by simply cutting off the end of the standard stuffing box.

Cooling Methods

The stuffing box is cooled by a water jacket of ample capacity. Further cooling of the packing is provided by in-and-out connections for the sealing oil, which is thus able to act as a coolant as well as a sealing medium. The stuffing box is provided with a water-flushed smothering gland. A second water jacket surrounds the front bearing and the lower part of the oil reservoir. For extremely high temperature operation, a water-cooled pedestal can be supplied.

Throat Bushing

A renewable throat bushing is tack-welded on the pump side of the stuffing box. The close clearance between the bushing and the shaft sleeve cuts infiltration into the stuffing box to a minimum. In case of seal or packing failure, the bushing remains in position and will not blow out.

Wearing Rings

The impeller and casing are both provided with front and rear wearing rings which make it easy and economical to maintain proper clearance. This design also reduces side thrust which in turn reduces shaft deflection and wear.

Double Volute

Double volute design is used in pumps of more than 400 gpm capacity. Forces set up in one volute are counteracted by equal and opposite forces in the other volute. Deflection forces are greatly reduced.

The impeller has low NPSH requirement so that it will successfully handle high volatile liquids at high temperatures.

Centerline Mounting

The pump is mounted at the centerline of the casing. Pipe strains are transmitted directly to the foundation. When proper precautions are taken, alignment of rotating parts will not be affected.

Complete Pumping Unit

Allis-Chalmers can supply a complete pumping unit — pump, motor and control — assembled and ready to install. Coordinated design and manufacture assure undivided responsibility. Call your nearby Allis-Chalmers District Office for help on your next pumping problem. Or write for Bulletin 52B7775. Allis-Chalmers, Milwaukee 1, Wis.

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ALLIS-CHALMERS

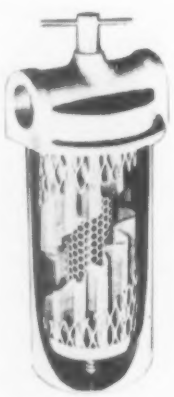
operate at a variety of temperatures (to 600°) and pressures (atmosphere to 3,000 psi.). *The Centrifix Corp.*

IT'S NEW CHECK IT

19 NEW HARD-FACING ELECTRODE FOR OIL-FIELD USE is particularly suited for hard-facing oil-field equipment; tool joints and pipe-line equipment such as buckets, carry-all scraper blades, and the like. Under extensive field tests for a period of nearly 2 years, Coated Tube Stoodite has been subjected to every possible use in order to determine its suitability for equipment of all kinds. Deposition rate is far faster than can be attained with cast electrodes and the welded deposit is smooth, sound, and free of pinholes or checks. With chromium and molybdenum as the principal alloys this material provides especially good resistance to all types of abrasion, exhibits high compressive strength, and has excellent impact resistance. Coated Tube Stoodite is readily weldable to all carbon and alloy steels including manganese. Deposits are semiaustenitic, and are not affected by ordinary heat-treat methods. Under normal welding procedure, either a.c. or d.c., deposits show a Rockwell C hardness of 56-60 and properties are retained at temperatures up to 800° F. *Stoody Co.*

IT'S NEW CHECK IT

20 MARVEL SYNCLINAL FILTERS. All models have recently been adapted for water applications. No changes have been made in the basic synclinal design. Maximum active filter area, longer periods of operation, no moving parts, and simplicity of maintenance features have been retained. Available for either sump or line installation in eight individual capacity size units from 5 to 100 g.p.m. Greater capacities are attained by multiple installations. Choice of mesh sizes ranges from coarse 30 to very fine 200 to handle various-size particles. *Marvel Engineering Co.*



IT'S NEW CHECK IT

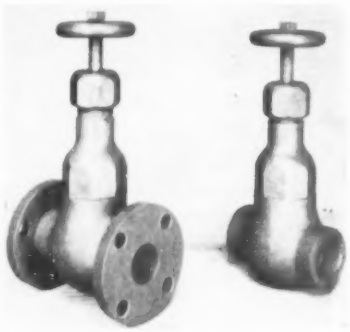
21 ATPET 100 is a nonmetallic rust inhibitor developed as an oil additive. Immediate indicated uses include the protection of diesel and gasoline engines, turbines, pipe lines, and ferrous tools or components in production stages. The new inhibitor is a sorbitan mono fatty acid ester. It is shipped as a 100 per cent material for addition by the refiner or compounder to his oils. Extensive testing shows consistently uniform protection considerably improved over kindred earlier inhibitors, even when Atpet 100 is used in reduced concentrations. Tests indicate that the material is suited for use in production pipe lines for diesel fuels and heavier oils. *Atlas Powder Co.*

IT'S NEW CHECK IT

22 NEW THREE-BLADE WALL SCRAPER has an absolute minimum of working parts; has no links or cables to wear, lock, or occasion down-the-hole trouble; and is capable of covering the entire range of oil-field scraping operations. It provides full circulation to hole bottom and has no internal bypasses, so that adequate fluid volume at the diamond point or bull nose is assured. The tool is equipped with three rugged, nonclogging, alloy-steel blades, proportioned to give plenty of rigidity during the scraping operation and placed to function with a smoothness and stability that are easy on the rig. The opening of the blades is accomplished hydraulically; the impetus being derived from the mud pumps through a patented circulation control head which creates a downward thrust on the opening plunger and thence completes the process. *Grant Oil Tool Co.*

IT'S NEW CHECK IT

23 REINFORCED PLASTIC PLUG-GATE VALVE. Material is polyester with glass fiber-mat reinforcing. This plug-gate valve is available in A.S.A. flanged, and threaded types for use with standard tapered pipe thread in ¾ to 4-in. sizes. Designed for operating pressure of 125 psi. with a safety factor of 10 to 1, the valve is resistant to most of the common corrosive materials existing in the petroleum industry. Temperature range is from —60° to 250° F. Method of molding is by matched metal dies with special techniques at pressures of 1,500 psi. to attain dense structure. *Ed Conley Plastic Corp.*

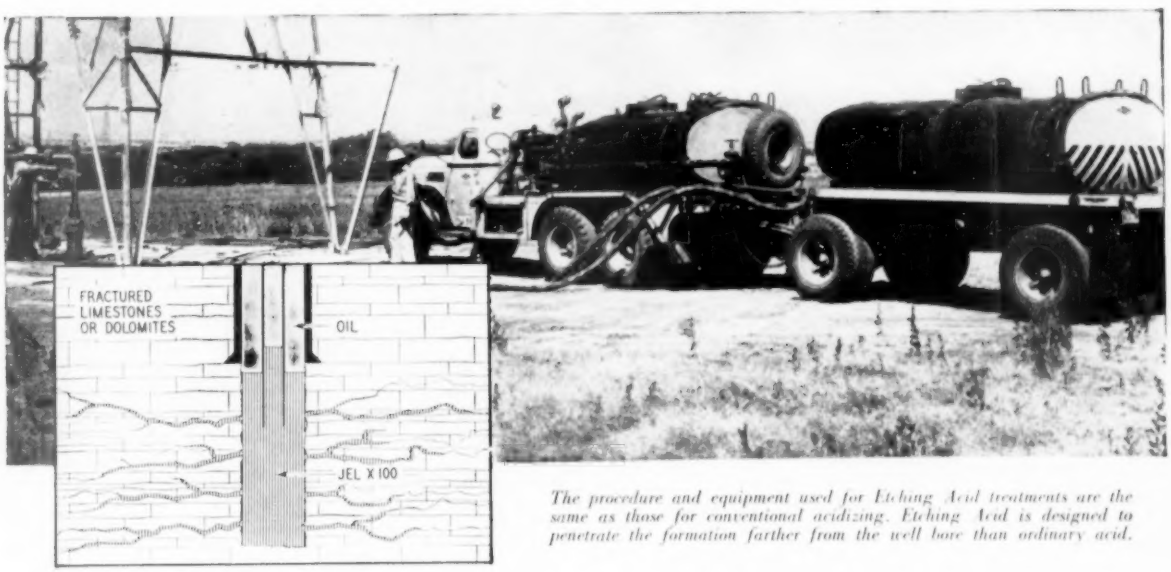


IT'S NEW CHECK IT

24 CONTINUOUS COKING UNITS. Blaw-Knox Co., through its Chemical Plants Division, offers to petroleum refiners the design and construction of continuous

ETCHING ACID GAVE RESULTS WHERE REGULAR ACID FAILED

Etching Acid increased production 25 BOPD after ordinary acid treatment failed to boost output



The procedure and equipment used for Etching Acid treatments are the same as those for conventional acidizing. Etching Acid is designed to penetrate the formation farther from the well bore than ordinary acid.

Here's the case history of an oil well that was completed in a limestone formation. It failed to respond to a conventional acidizing treatment, so Dowell was called in for consultation on the job. Dowell engineers analyzed the well and recommended an Etching Acid treatment. This suggestion was followed and production was increased from 8 to 33 BOPD.

Etching Acid treatments, using Jel X 100, are primarily suited for use in limestone or dolomitic formations with either fractured or vugular porosity. Etching Acid is designed to etch fractures or "vugs" . . . to clean fractures by removing calcite, mud, silicate and feldspar materials . . . to penetrate formations far from the well bore before the acid becomes spent. No auxiliary jel-breaker solution is required following Etching Acid.

If you would like to know more about Etching Acid or any of the many other Dowell oil field services, contact the nearest Dowell office. Or, if you prefer, write directly to Tulsa, Dept. K-11.

DOWELL SERVICE

Acidizing • Fracturing • Electric Pilot • Perfojet
Paraffin Solvents • Bulk Inhibited Acid • Jelflake℠
Corban℠ • Chemical Cleaning for Heat Exchange Equipment

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A Subsidiary of The Dow Chemical Company

"First in Oilfield Acidizing . . . Since 1932"

Look to DOWELL
FOR OIL INDUSTRY CHEMICAL SERVICE

coking units, by arrangement with Standard Oil Development Co., owners of the fluid-coking process. The process is designed to convert heavy fuel oils or residues into more valuable materials. Any reduced crude or pitch that can be pumped may be charged to the unit. Much of the product is suitable for cracking to form motor fuel. The coke residue is produced in small particles, and is handled as a fluidized solid. Operation is continuous, without periodic decoking. *Blaw-Knox Co., Chemical Plants Div.*

IT'S NEW CHECK IT

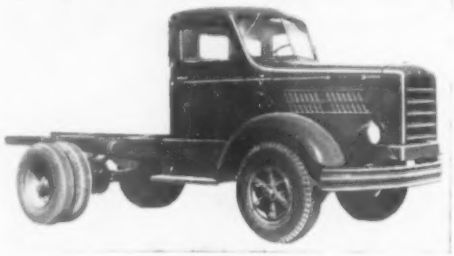
25 EVINRUDE BIG TWIN ELECTRIC. The new motor, a 25-hp. unit, no longer depends on the starter cord used in earlier outboards. Instead, an auto-type starter driven by an electric motor and operated by a push button in a small panel on the dash starts the motor at the touch of a finger. Power for the starter motor is supplied by a standard 6-volt automobile battery. A second button actuates an electrically operated choke for cold starts. The new motor, which has standard Evinrude magneto ignition, comes from the factory completely equipped with everything needed to install it in either an open or cabin boat. This includes the push-button dash panel, a control and junction box to be attached to the boat's transom, all necessary cables, and clips to attach the dash panel cable to the boat. Cables are fitted with terminal clips for easy attachment and are color coded to make installation simple. Both the starter cables and the Simplex remote controls can be attached or removed in a few seconds, so the motor can be easily taken off or installed. *Evinrude Motors.*

IT'S NEW CHECK IT

26 METER PENS HAVE CONTINUOUS INK SUPPLY. Recording is possible for periods up to a year with only one filling and virtually no attention. Clear-cut, distinct, uniform lines, contributing to a high degree of accuracy, are produced by controlled flow of the precision pens. Pulsating flow, rapid pen movement, and atmospheric fluctuations have no effect and the chances for errors through unrecorded intervals are eliminated. Pens are stainless steel and nonclogging. A continuous supply of ink is assured by capillary feed upward through a flexible plastic tube connected to a ½-oz. reservoir. The reservoir, suspended inside the recorder case, protects the ink from dust and atmospheric contamination. These pens may be mounted on installed meters and are available in various types for all standard recording instruments. *American Meter Co.*

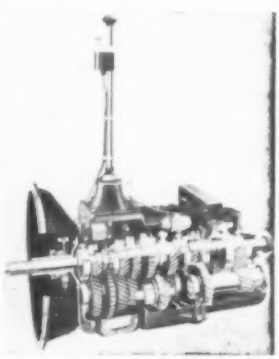
IT'S NEW CHECK IT

27 MATH-MATIC DESIGN was announced as the outstanding feature of these new four and six-wheel drive trucks. Math-Matic design produces a mathematically correct proportioning of truck weight and power between front and rear wheels, resulting in 30 to 37 per cent more tire life and 40 to 82 per cent more tractive ability. Among 15 other major new features are Rigi-Tapered frame with deep taper design which rigidizes the front end for mounting equipment and distributes load over the entire frame; a new, larger, full-floating rear axle said to be 30 per cent stronger; trunion-mounted radiator, isolated from frame by rubber; rubber-cushioned engine mountings; valve-in-head engines, light weight with high power output; diesel engines available for all models; 12-volt electric system; heavy-duty steering gear with power steering optional; and stirrup-action clutch and brakes with clutch hydraulically assisted and brakes power assisted. *The Four Wheel Drive Auto Co.*



IT'S NEW CHECK IT

28 FULLER R-45 ROAD RANGER. Finger-tip-controlled range-selector switch button, mounted conveniently on the single shifting lever of the new eight-speed transmission, electrically preselects high or low range in an air-shifted auxiliary section coupled to a four-speed front section. The combination unit shifts ranges, provides eight speeds forward with one-third less shifting. For 125-160-hp. trucks, the R-45 is designed for installation behind engines delivering up to 385 lb.-ft. of torque. R-45 has these advantages: No gear splitting, eight selective gear ratios, evenly and progressively spaced; easier, quicker shifts, 38 per cent steps; one shift lever control in all eight forward speeds; higher average road speed; and engine operation in peak horsepower range with greater fuel economy. *Fuller Manufacturing Co.*



IT'S NEW CHECK IT

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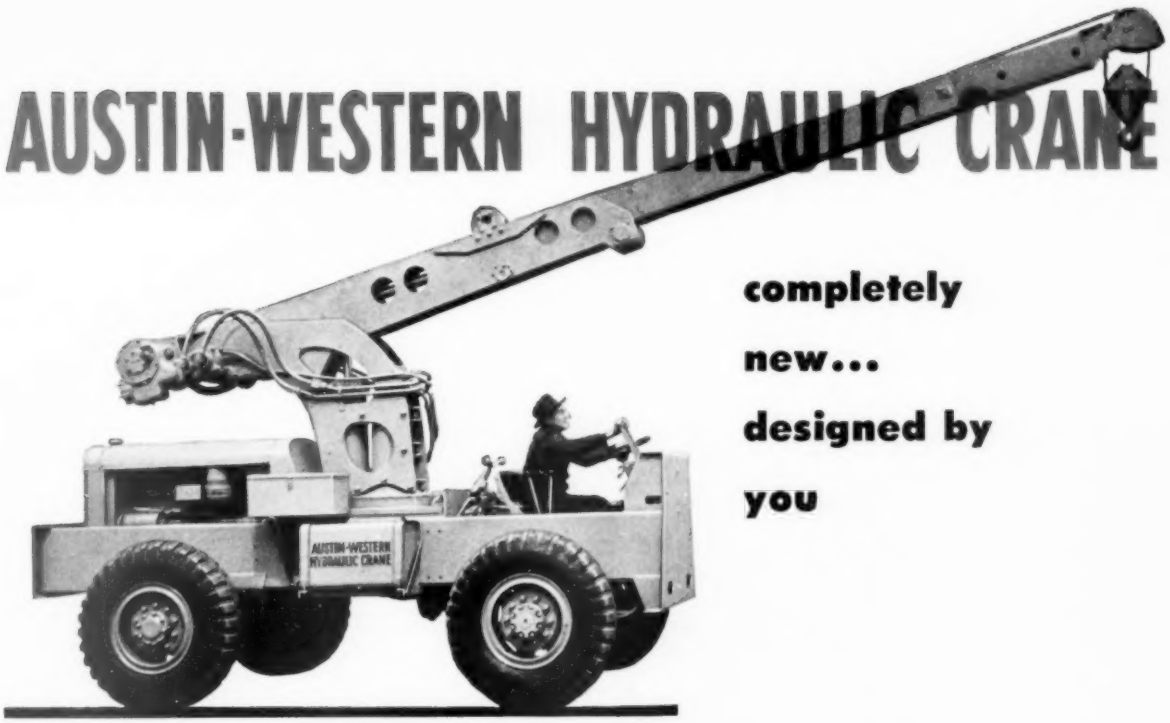

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PIPE LINE

Two Columbia Companies Plan 116-Mile Gas Line

WASHINGTON.—Atlantic Seaboard Corp. and Virginia Gas Transmission Corp., both of Charleston, W. Va., plan to construct 116.6 miles of 26-in. transmission line and 440-hp. in compressor facilities along an existing transmission system in West Virginia, Virginia, and Maryland.

In an application to the Federal Power Commission, the two Columbia Gas System, Inc., subsidiaries state that the proposed line will be in five sections paralleling portions of the companies' present line between Cobb, W. Va., and Baltimore. The compressor units will be added to two existing and one new station. Total cost of the entire project has been set at $14,634,300.

During the 1954-55 winter, the firms' existing transmission system, which has a capacity of 470,300,000 cu. ft. of gas daily, is expected to incur a deficit of 86,400,000 cu. ft. per day. The proposed line will enable the companies to fulfill present customer demands during this season.

Presently, the two firms own and operate a 421-mile line from Boldman, Ky., to the Pennsylvania-Maryland state line from Clendenin, W. Va., to a point near Rockville, Md.

Offshore Gas Line Finished

HOUSTON.—Marine Gathering Co., Houston, has put its second offshore natural-gas pipe-line into operation off the coast of Louisiana.

The 10¾-in. line runs 10 miles off the coast of Vermilion Parish to a platform of Phillips Petroleum Co. and Kerr-McGee Oil Industries, Inc. It has a capacity of 80,000,000 cu. ft. daily and is buried beneath the floor of the Gulf of Mexico, in 45 ft. of open water.

Marine Gathering Co. completed the world's first natural-gas pipe-line under open waters in 1951.

Texas Gas Proposes to Loop 26-In. Transmission System

WASHINGTON.—Texas Gas Transmission Corp., Owensboro, Ky., plans to lay about 48 miles of loop lines along

Permian's Hobbs Compressor Station Near Completion

Work is scheduled for completion next month on Permian Basin Pipe Line Co.'s compressor station and dehydration and desulfurization facilities 6 miles west of Hobbs, N. M. The compressor station has three 1,320-hp. reciprocating compressor units. The desulfurization and dehydration facilities, together with a natural-gasoline plant to be completed in April 1954, are designed for an initial throughput of 50,000,000 cu. ft. of gas daily with provision for quick expansion of capacity to 200,000,000 cu. ft. daily. The facilities will handle high-pressure gas from the producing area extending south and west from Hobbs through Monument, N. M. Construction contract is held by Dresser Engineering Co.

See Composite and Refinery Catalogs, or Write for Folder On

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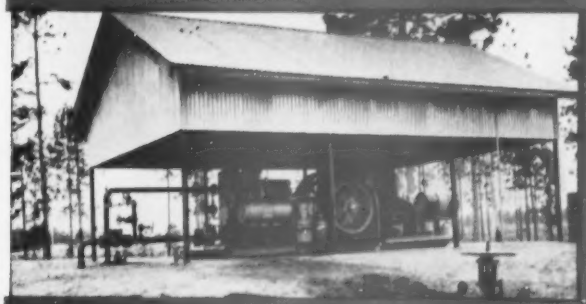
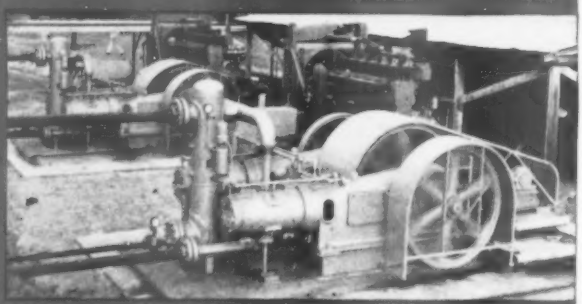
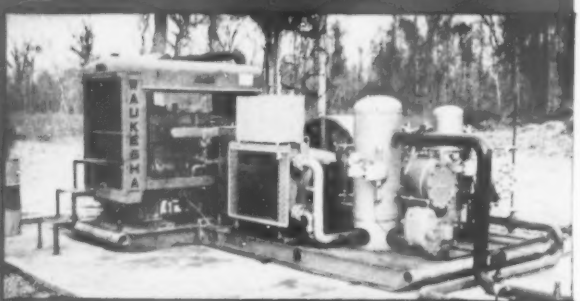




for booster service, air-gas lift,
gas injection or re-pressuring.



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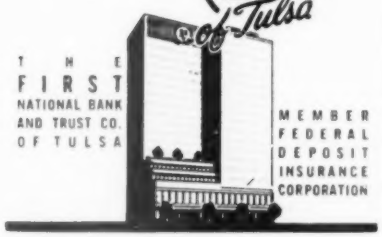

THE FIRST NATIONAL BANK AND TRUST CO. OF TULSA
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an existing 26-in. transmission system from Memphis and Slaughters, Ky.

In addition, the company proposes to add compressor facilities at one of its compressor stations between the two cities. In an application to the Federal Power Commission, the firm pointed out that the $4,280,000 project is designed to supply 50,000,000 cu. ft. of gas daily to American Louisiana Pipe Line Co.'s proposed 30-in. line from the Louisiana Gulf Coast to Detroit. The pipe-line company, a subsidiary of American Natural Gas Co., is seeking FPC authority for the $120,000,000 transmission system *(The Oil and Gas Journal, October 19, page 92)*.

Texas Gas has two parallel 26-in. lines running from Bastrop, La., to Slaughters. Also, the company has dual 18-in. lines extending from the Bastrop area to Memphis.

Manufacturers to Construct 12 to 26-In. Gas Lines

PITTSBURGH.—Plans to construct 75½ miles of various size natural-gas lines and 4,180-hp. in compressor facilities in Pennsylvania and West Virginia have been revealed by Manufacturers Light & Heat Co. here.

The project includes 3.65 miles of 12-in., 23.3 miles of 12-in. loops, 14.4 miles of 10-in., 18.5 miles of 20-in., 5.6 miles of 24-in., 10.22 miles of 26-in., a new 3,300-hp. compressor station, and installation of 880-hp. at an existing station. The facilities would be located along the company's present transmission system in Washington, Allegheny, Chester, Lancaster, and Adams counties, Pennsylvania, and Marshall County, West Virginia.

The company states that the $5,792,550 project is needed to fulfill requirements of existing customers during the 1954-55 winter. Manufacturers, a Columbia Gas System, Inc., subsidiary, has filed with the Federal Power Commission seeking permission to carry out the program.

Service Nears Completion On 154-Mile Crude Line

MANDAN, N. D. — Service Pipe Line Co., Tulsa, lacks less than 20 miles of completing a 154-mile crude line from Tioga, N. D., to a 30,000-bbl. refinery being constructed here.

The completed portions of the line include 57 miles of 12-in. pipe from Tioga to the banks of the Missouri and Little Missouri rivers. The rivers were crossed with 16-in. pipe which is being used to complete the remaining 93 miles to Mandan. Most of this latter

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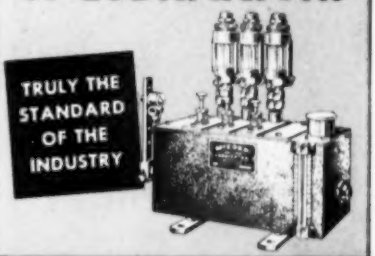

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stretch has been completed with the last section of the line scheduled to reach Mandan in mid-December.

Upon completion part of the 30,000-bbl. line will be used to bolster the gathering system in Tioga and Beaver Lodge field until Standard Oil Co. (Ind.) finishes its Mandan refinery next fall *(The Oil and Gas Journal, August 31, page 150)*.

Recently a 10¾-in. products line connecting the refinery site with an existing products system in Moorehead, Minn., was completed. Products are being received at Mandan through the new line, but when the Standard refinery is completed the flow will be reversed *(The Oil and Gas Journal, November 2, page 161)*.

R. A. Goodall's Widow Takes Over New Pipe-Line Company

OMAHA. — Mrs. C. M. Goodall, widow of the late R. A. Goodall of Ogallala, Neb., has taken over all of her husband's interests, in which she has been an active partner, including the recently formed Goodall Pipe Line Co.

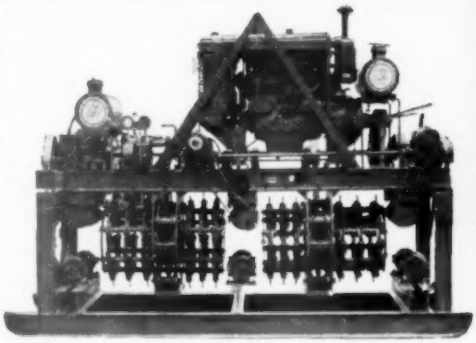
The pipe-line firm, in which Sinclair Pipe Line Co. holds a minor interest, is constructing a 45-mile, 8-in. crude line from Badger Creek to Toronto Pipe Line Co.'s system in Merino, Colo. The new line, which is expected to be completed late next month, will carry up to 18,000 bbl. of crude delivered to it through a proposed gathering system in Badger Creek, Little Beaver, and Middlemist fields, located in Adams and Washington counties, Colorado *(The Oil and Gas Journal, September 28, page 167)*.

At the time of his recent death, Goodall was tentatively planning to build a natural-gasoline plant in the Little Beaver area. Lion Oil Co. and Continental Oil Co. were reported to be seeking an interest in the project *(The Oil and Gas Journal, September 28, page 165)*.

Home Plans Two 12-In. Gas Lines in New York

WASHINGTON.—Home Gas Co., Pittsburgh, is seeking Federal Power Commission authority to construct about 50 miles of 12-in. transmission lines in Broome, Tioga, and Delaware counties, New York.

The $2,160,500 project includes 24.3 miles of line from Maine to Tioga, N. Y., and 25.4 miles of line from Deposit to Port Dickinson, N. Y. Gas for the proposed lines will come from a pooled supply of Columbia Gas System, Inc., Home's parent company.



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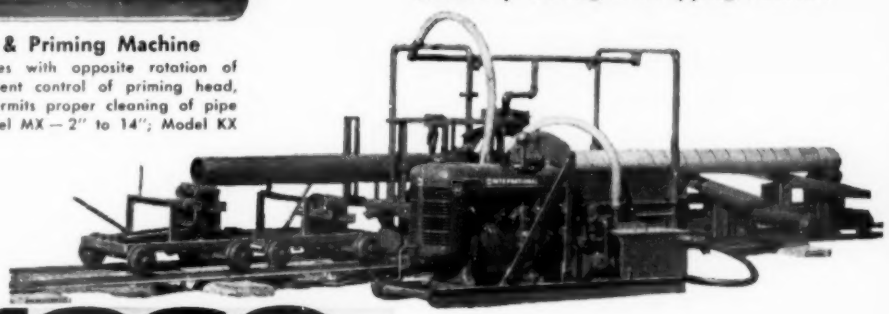

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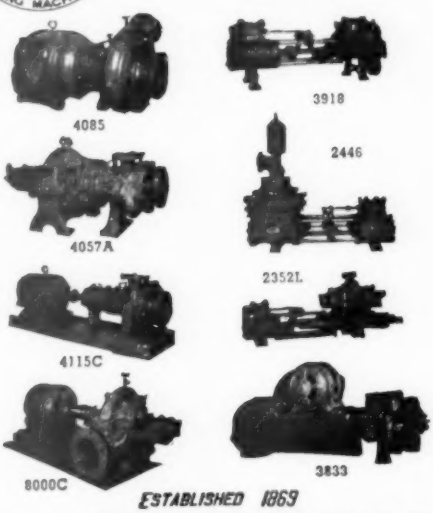

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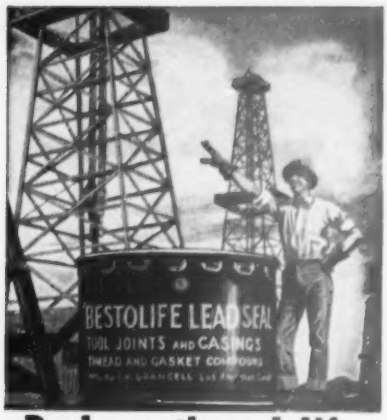

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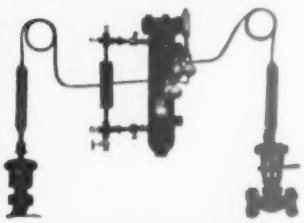

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Among the Drilling Contractors

Manning Rigs Busy In Rocky Mountain Region

R. L. Manning, Inc., Denver contracting firm, reports it is keeping its 10 rotary rigs busy in the widespread development play under way in the Rocky Mountain region. Except for one rig drilling for its own account in Grass Creek field, in the Big Horn basin of northwestern Wyoming, all are on contract jobs.

Current contract operations of the firm include: One each for Sinclair Oil & Gas Co. at Grass Creek, Socony-Vacuum Oil Co. at Manderson, Argo Oil Corp. at Hamilton Dome, The Texas Co. at Garland, Ohio Oil Co. at Garland, Trigood Oil Co. at Greybull, all in the Big Horn basin; Trigood Oil Co. at Gillette, in the Powder River basin, of northeastern Wyoming; The Texas Co. at Table Rock, in the Green River basin, of southwestern Wyoming; and Shell Oil Co. at Little Beaver, in Fallon County, eastern Montana.

Thomas P. Pike Drilling Co., Los Angeles, has a rig under contract to Russell Giffen for a confirmation well to the recent Harnish oil-discovery at West Guijarral Hills, near Coalinga, in Fresno County, California. The location offsets the discovery to the northwest.

Loffland Brothers Co. and **Fillmore Drilling Co.** are keeping up a steady drilling program for Richfield Oil Corp. in the Los Lobos field at San Emidio Ranch, near Ventura, in Ventura County, California. With each running one rig, they have completed eight wells in the 15 months since the field was discovered, and currently are drilling two more.

Newton Drilling Co., Coalinga, Calif., has a new wildcat operation under way in the Pyramid Hills area of Kings County, California, where it is drilling for Brookline Oil Co. Current test is 2 Travma, in 8-24s-18e, 2 miles from nearest production, which is found at a depth of 4,400 ft.

H. L. Rowley, Inc., Shreveport, is scheduled to drill two wells in the Overton field, in southern Adams County, Mississippi, for Lee Oil & Exploration Co. Both are projected to the Wilcox formation, the field's present producing horizon. One, 2 McCaleb, is projected to 6,550 ft., and the other, 3 McCaleb, to 6,750 ft.

Marshall Young is contractor on Humble Oil & Refining Co.'s projected Lower Cretaceous-Rodessa test being started in Soso field, Jones County, Mississippi. The test, designated as 1 Welborn, is the first Lower Cretaceous test started in the field since completion by Gulf Refining Co. last August of its Rodessa zone oil-discovery well. Location is about 1¼ miles east of Gulf's well, which found the pay at a depth of 11,966-90 ft.

J. C. Clower has a new wildcat operation under contract for Emperor Oil Co. in the general Lazy J and Sanders

On location in Bornholdt field, south of Windom, in western McPherson County, Kansas, where Braden Drilling Co. is drilling for its associated producing company, J. W. Braden Oil Co. Left to right: Marvin Mills and Art Winters, pumper and production superintendent, respectively, for the producing company; John W. Braden, independent drilling contractor and producer, and principal owner of the above companies; and Ray Jones, driller for the contractor.

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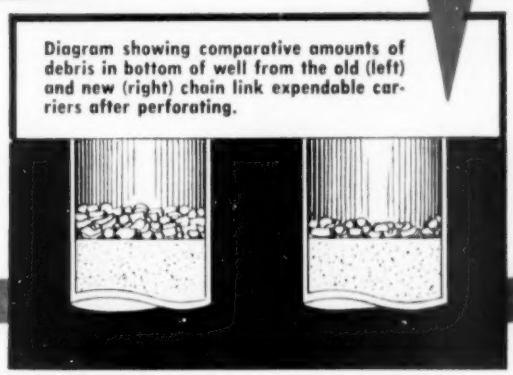

Diagram showing comparative amounts of debris in bottom of well from the old (left) and new (right) chain link expendable carriers after perforating.

Johnston Testers' engineering program has produced an advanced design of the Expendable Jet Gun used in their Shoot-Produce Method of well completion. A redesigned chain link expendable carrier and a 32 gram charge, manufactured by companies who specialize in this work, reduces the debris from perforation to about half that of the previous design.

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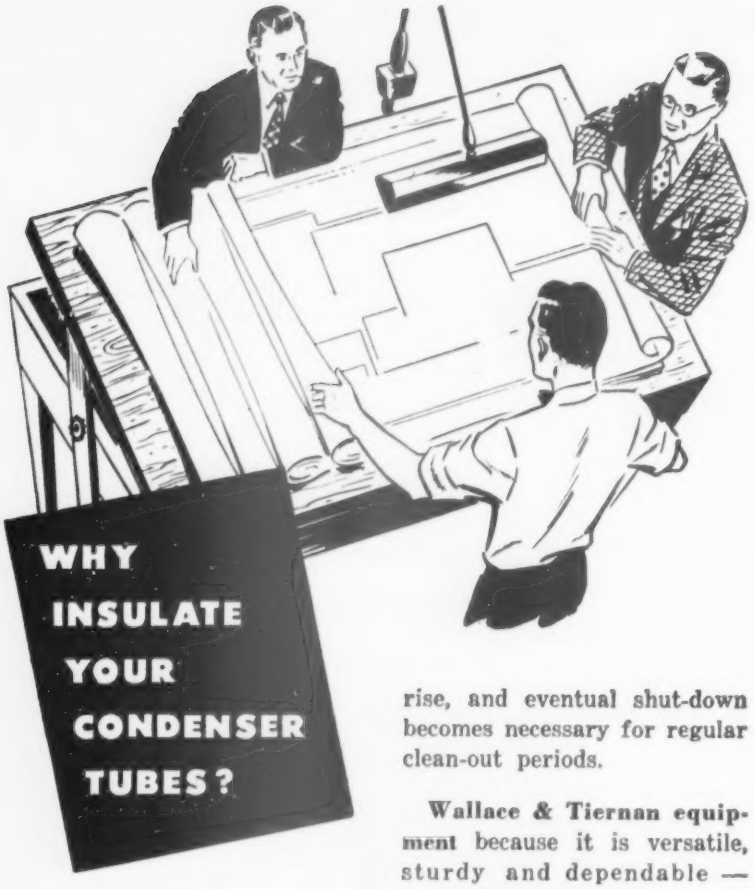

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area of western Lea County, New Mexico. The test, projected to 4,200 ft., is listed as 1-B Amerada-State. Location is in 21-13s-33e.

K. B. Drilling Co. has taken a contract for a rank wildcat test to be drilled for Sid Katz and associates in De Baca County, New Mexico. Location, in 13-1n-22e, 10 miles northwest of Ingleville, is more than 60 miles from nearest production. Contract is for 6,500 ft.

Delta Drilling Co., Tyler, Tex., has a new contract job under way for D. D. Feldman Oil & Gas Co. at a wildcat location, 1 T. J. Cunningham estate, 3½ miles west of Jacksonville, in Cherokee County, East Texas. Spot location is in the Jose Pineda Survey.

Rainbow Drilling Co. and **B. F. Snowden** are the contractors on two new operations Murray Petroleum Co. is starting in the West Fouke area of Miller County, southwestern Arkansas. Rainbow's job is at 1 Killion, in 15-17s-27w, while Snowden's is at 1 Davis, in 21. Both operations are offsets to Murray's recently completed Tuscaloosa extension-discovery well.

Appling Drilling Co., contracting for Charles G. Dunwoody, Jr., of Houston, is starting a 7,000-ft. test on the west side of East Mauritz field, eastern Jackson County, Texas Gulf Coast. The test is being drilled as 1 Mauritz Brothers. Location is in Section 17, Morris & Cummings Survey.

J. I. Roberts Drilling Co., Shreveport, has taken a contract with C. H. Murphy, Jr., of El Dorado, Ark., for a Cotton Valley exploratory test to be drilled at 1 Adger, in 10-19n-14w, 3½ miles southwest of Benton, in Caddo Parish, northwestern Louisiana. Location is 3½ miles from nearest production.

ACTIVE ROTARY RIGS*

Area—	Week ended 11-16-53	Change week ended 11-9-53	Change week ended 11-17-52
Gulf Coast	588	+ 3	— 21
N. & W. Tex.-N. M.	854	+15	— 2
Ark.-N. La.-E. Tex.	203	+ 8	— 59
Oklahoma	389	+25	— 61
Kans.-S. Neb.	160	— 4	— 25
Illinois-Eastern	158	— 5	— 13
Rocky Mountains	285	—18	+ 45
Pacific Coast	162	+ 1	— 7
Total U. S.	2,799	+25	—123
Western Canada	159	+ 8	— 28
Total	2,958	+33	— 95

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States, and the Arkansas-North Louisiana-E. Texas and Gulf Coast areas are shown on pages 167 and 168.

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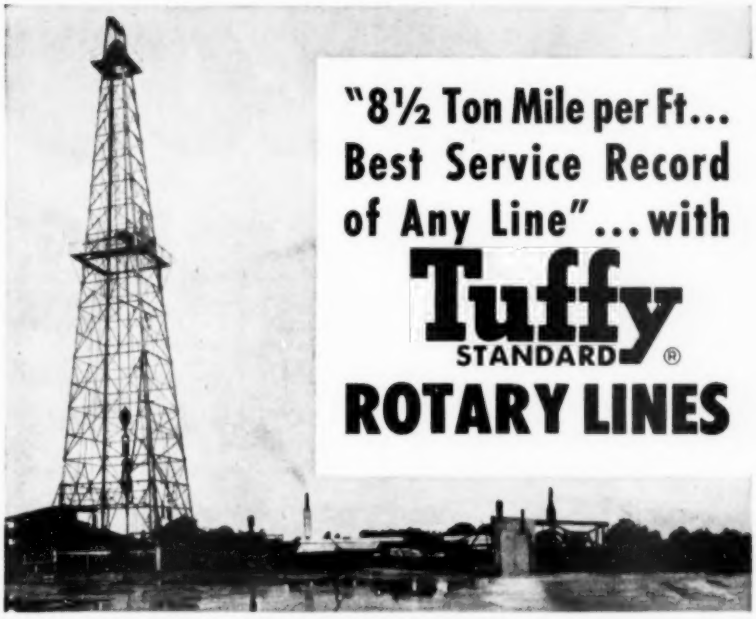

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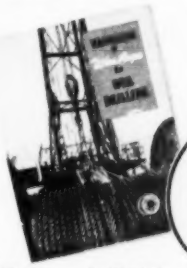

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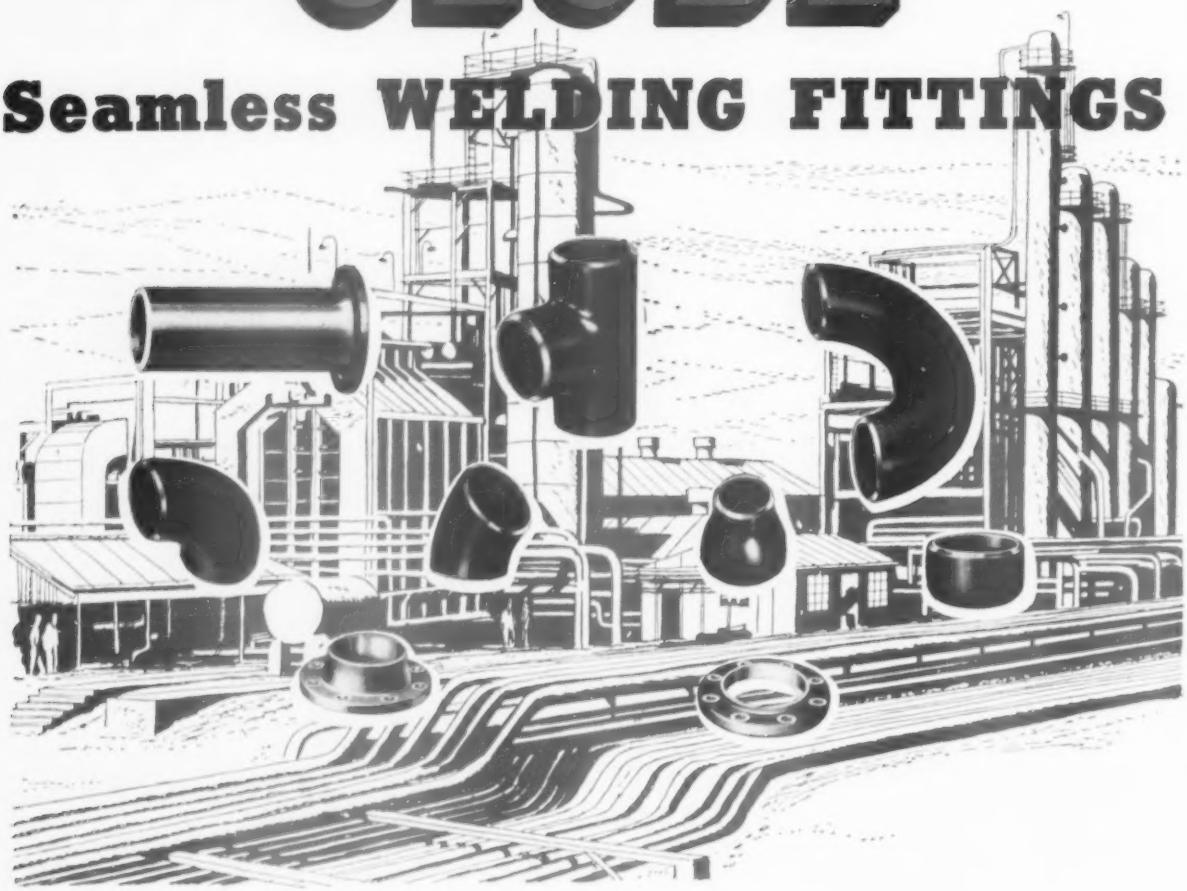

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REFINING

Oversupply Shown

Refineries offer military more products than sought

WASHINGTON. — Currently easy supply conditions are being reflected in proposals for the supply of petroleum products for the armed services.

Approximately 140 bids were received by the Armed Services Petroleum Purchasing Agency November 3 for bulk petroleum requirements, not including aviation gasoline. Offers ranged from 113 to 591 per cent of the quantities sought.

The bids to ASPPA totaled:

. . . Navy special: West Coast, 4,500,000 bbl. sought, 7,700,000 bbl. offered; coverage 175 per cent; East Coast, Gulf and Caribbean, 7,000,000 bbl. sought, 7,900,000 bbl. offered, coverage 113 per cent.

. . . Marine diesel: West Coast, 1,155,000 bbl. sought, 2,130,000 bbl. offered, coverage 176 per cent; East Coast, Gulf and Caribbean, 2,000,000 bbl. sought, 4,625,000 bbl. offered, coverage 231 per cent.

. . . Low-pour diesel—70: 1,035,000 bbl. sought, 3,846,000 bbl. offered, coverage 371 per cent.

. . . Low-pour diesel — 40: 690,000 bbl. sought, 3,585,000 bbl. offered, coverage 391 per cent.

. . . Gasoline — automotive combat: 4,500,000 bbl. sought, 17,610,000 bbl. offered, coverage 391 per cent.

. . . Gasoline—automotive regular grade: West Coast, 180,000 bbl. sought, 800,000 bbl. offered, coverage 444 per cent; East Coast, 125,000 bbl. sought, 625,000 bbl. offered, coverage 625 per cent.

. . . Fuel oil—No. 6: West Coast, 750,000 bbl. sought, 3,540,000 bbl. offered, coverage 472 per cent.

Aurora Gets 10-Year Lease On 12,500-Bbl. Refinery

DETROIT. — Aurora Gasoline Co. here has completed negotiations with Old Dutch Refining Co. for the leasing and operation of the latter's 12,500-bbl. per day refinery at Muskegon, Mich. The lease extends for 10 years from November 15.

Also leased, are the Old Dutch crude-oil terminal at East Chicago, Ind., marine terminal marketing facilities at North Muskegon and Milwaukee, and a lake tanker.

Aurora operates a 35,000-bbl. per day refinery at Detroit and a 6,000-bbl. per day plant at Elsie, Mich. With the Old Dutch plant, controlled crude

New International Refinery Is On Stream

The newest and most modern refinery in the Upper Midwest was dedicated recently at Wrenshall, Minn., just south of Duluth. The new $7,000,000 International Refineries, Inc., refinery has a daily capacity of 11,500 bbl. It gets its crude from the Interprovincial Pipe Line which passes through Wrenshall en route from Edmonton, Alta., to its lake terminal at Superior, Wis. Distillation catalytic cracking and polymerization are combined in one unit at the refinery.

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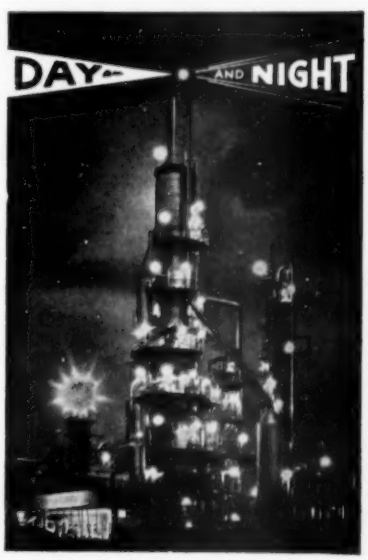

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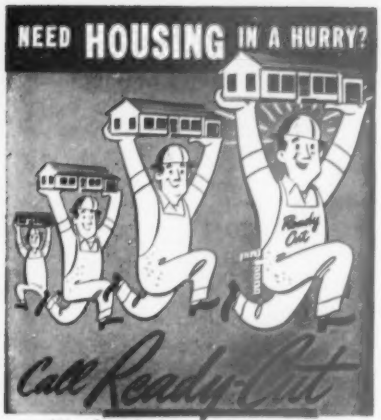

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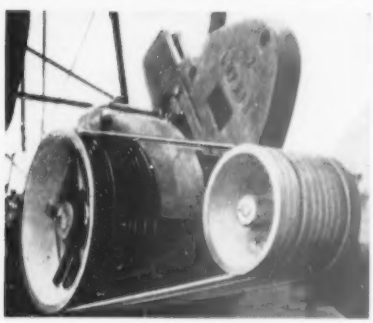

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capacity is expanded to 53,500 bbl. per day. Including a 1,500-bbl. per day Platforming unit which Aurora is completing at Elsie, the company will operate three Platformers with aggregate capacity of 11,700 bbl. per day, for the production of high octane gasoline.

Corpus Christi Dedicates New Refining Facilities

CORPUS CHRISTI.—New facilities of Corpus Christi Refining Co., which will raise the refinery's capacity by 10,000 bbl. per day, were officially dedicated here last week.

The company holds a U. S. Government contract to supply about 1,380,952 bbl. of jet fuel to the Armed Forces for the year ending June 1954. Two-year contracts have been signed by the company assuring adequate supplies of raw materials, principally distillate and selected crude.

New facilities include topping and vacuum units, plus five storage tanks. The refinery is on the Corpus Christi Ship Channel.

Berry Leases 6,000 Bbl. Refinery From Johnson

GARY, Ind.—Berry Asphalt Co. of Magnolia, Ark., has taken over the operation of the 6,000-bbl. per day refinery here of Johnson Oil Supply Corp. on a lease-rental arrangement with a purchase option. The refinery's residual production, previously marketed as No. 6 fuel oil, will be converted to asphalt manufacture.

A vacuum tower has been installed, and asphalt blowing and packaging units are being added, together with new laboratory and office facilities. The company is not now exercising a certificate of necessity which was granted to cover the cost of a new catalytic-cracking unit.

New Super Pressures Unit Dedicated at Northwestern

EVANSTON, Ill.—Dedication ceremonies for a new Super Pressures unit at the Ipatieff Catalytic and High Pressures Laboratories, Northwestern University, were held here last week.

The new unit, which took 5 years to design and build, is the first of its type in a North American university. It will be used by students and scientists to study and do research on application of super pressures to catalytic reactions of organic compounds. The late Prof. V. N. Ipatieff, for which the laboratories are named, gained world fame in his work in high pressures and catalysis.

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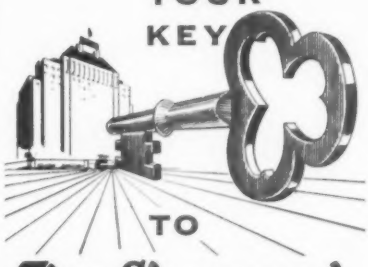

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NATURAL GAS

United Fuel Pushes Plans For Huge Storage Project

WASHINGTON.—United Fuel Gas Co., Charleston, W. Va., plans to construct a 4,400-hp. compressor station which will enable the company to store up to 10,720,000 cu. ft. of gas in its Jackson County, West Virginia, underground-storage reservoir.

United Fuel, a Columbia Gas System, Inc., subsidiary, states in an application to the Federal Power Commission, that the station will be located at the storage, which is known as Pool X-59. Company officials claim that the $2,240,000 compressor facilities will be necessary in order to increase injections into the reservoir.

Present plans call for the huge quantities of gas to be stored during the summer of 1955, with 6 billion cubic feet going into storage during July and August of that year. In this connection, the applicant points out that the proposed compressor station will assist in injecting 125,000,000 cu. ft. daily.

Central Illinois' Application For More Gas Gets Final Nod

WASHINGTON.—The Federal Power Commission has given final approval to an order directing Trunkline Gas Co., Houston, to supply Central Illinois Public Service Co., Springfield, with 2,000,000 cu. ft. of gas daily.

The gas will be delivered through a proposed connection near Neoga, Ill. The new supply will go to meet demands in Mattoon, Paris, Charleston, Ashmore, Kansas, Neoga, Sigel, and Effingham, Ill. However, Central Illinois points out that it still needs 2,500,000 cu. ft. daily to meet all customer demands. The company anticipates getting this additional gas from its supplier, Panhandle Eastern Pipe Line Co. *(The Oil and Gas Journal, October 19, page 189).*

September Sales Up Slightly

NEW YORK.—Natural-gas sales during September showed a gain of 86 million therms over the preceding month, according to the American Gas Association here.

The September sales of 3,401 million therms also were up 1.3 per cent over the 3,356 million therms sold in September 1952. For the 12-month period ending September 30, gas sales totaled 52,484 million therms, a 10.7 per cent gain over the previous yearly sales of 47,420 million therms.

The index of natural-gas sales for September was 161.3 per cent of the 1947-49 average.

Gas Act Violations Charged

WASHINGTON. — Charges of violating the Natural Gas Act have been levied against Panhandle Eastern Pipe Line Co., Kansas City, by a Federal Power Commission official.

The charges, brought by Examiner Marvin Farrington, include selling gas to an industrial customer without FPC authority, and establishing priority of service to some industrial customers different from the tariff and rate schedules filed by Panhandle.

Also involved in the illegal gas-sale charge is Southeastern Michigan Gas Co., Port Huron, Mich.

The FPC official said Panhandle has been supplying Mueller Brass Co. of Port Huron through Southeastern Michigan. Farrington said that in addition to Panhandle not getting FPC permission to make these deliveries, Southeastern Michigan has not filed a rate schedule with the commission. The deliveries to the brass firm began in November 1951 and during the first 12 months, 107.6 million cubic feet of gas was delivered, according to Farrington.

The other charge deals with contracts between Panhandle and direct sale industrial customers which contain a so-called "superior" interruptible provision. Farrington said this provision permitted these customers to be the last of all interruptible customers to be cut off from their gas supply when requirements of resale customers needed to be filled.

Tennessee Doubles Capacity

HOUSTON.—Tennessee Gas Transmission Co.'s recently completed 1953 expansion program has raised the firm's delivery capacity from 65,000,000 to 1,445,000,000 cu. ft. daily.

In a third-quarter report to stockholders, it was revealed that the Federal Power Commission has authorized further expansion of the company's system to a delivery capacity of 1,694,500 cu. ft. per day, and peak-day capacity of an additional 200,000 cu. ft. Presently, Tennessee is seeking FPC authority to carry out a $45,000,000 expansion project in Pennsylvania and New York next year, which would raise the company's capacity to 2,100,000,000 cu. ft. daily *(The Oil and Gas Journal, November 16, page 187).*

Annual Sales, Revenues Up

WASHINGTON.—Natural-gas sales and revenues derived from such sales in 1952 totaled 7.10 trillion cubic feet and $1,884,919,000, respectively, according to reports submitted by gas companies to the Federal Power Commission.

These figures represent an increase of 9.7 per cent in sales and 17.7 per cent in revenues over sales of 6.47 trillion cubic feet and revenues of $1,600,596,000 in 1951. Last year an average of 7,270,000 customers were supplied compared to 6,837,000 in 1951.

Natural Gas to Hydrogen and CO_2 to Methanol

These giant reformers at the Sabine River plant of E. I. du Pont de Nemours & Co., Inc., at Orange, Tex., convert natural gas into hydrogen and carbon monoxide for methanol synthesis. Methanol is the principal ingredient of the company's "Zerone" antifreeze for motor vehicles. In addition to methanol, the plant turns out intermediate chemicals for nylon and plastic molding powders.

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EXPLORATION

There's Oil in Your Future

by Philip C. Ingalls

THERE is more undiscovered oil in sight today within the United States than there ever has been at any given time in the past.

The most important factor contributing to this optimistic outlook is the nature of today's exploratory thinking. The approach that ruled out this or that sparsely drilled area as a potential producing province for one strange reason or another has given way to the idea that oil can be found wherever there are sedimentary rocks of any kind.

Today's oil finders know that no sedimentary-rock section should be condemned on the basis that it didn't offer the environments and conditions favorable for the origin and accumulation of oil. No one knows just what those conditions had to be. What seems to be an answer in one area falls down in another.

Prior to April 1951 some geologists did not consider the geologically inactive area of North Dakota as a place to look for oil. Wildcats digging in the Tertiary beds of the Uinta basin were said by some to be a waste of time and money until one was completed for 1,600 bbl. of oil per day. Surface-expressed anticlines in the Rocky Mountains that could not be closed by an alidade-and-plane-table survey were not the kind of structures to drill if oil production was the objective; they weren't, that is, until 20 million barrels of oil was found in such an anticline. The flank of an anticline which has water at its crest was no place to drill for oil and yet, today, oil fields are being found in just such positions.

Those examples of complete reversals of negative thinking are not taken from a list of oil-country superstitions, but were convictions held by scientific investigators. Neither were they taken out of the dark ages, but from records of the last few years. Other principles now accepted without question will doubtless be proved erroneous within the next few years.

Some mathematically trained personnel in the exploratory end of the oil industry scoff at geologists who give their imagination free rein in their search for oil. These scientists consider oil-finding approaches that are not based on two-plus-two-equals-four as nonsensical. They overlook the fact that it has always taken someone's crazy idea to start a new surge of oil finding. They overlook the fact that if a geologist's thinking had to wait for factors that would fit into a formula, there never would be any oil found—that there can never be any specific information to work from until what might be called "geologic gossip" arouses the desire to scientifically prospect an area.

Oil finding can never be reduced to a formula. Geologic and geophysical data may someday be fed into an electronic calculator that will flash out a wildcat location, but the robot's answers will be no better than the thoughts fed into it by a coordinated group of specialists schooled in the art of oil finding. As such, its advantage over today's round-table discussions will be one of time only.

Someone recently said that the difference between a geologic genius and an idiot is 23 ft. of saturated sand. The same thing might be said for the difference between the man who is pointed out as one who thought ahead of the pack and the man who was said to be spreading geologic gossip.

There is a definite value to the unfettered geologic thinking that accents the positive. It stimulates the imagination needed to find oil. As long as uninhibited ideas might someday provide an excuse to dig some wells in an area that hasn't been drilled, they should not be ignored. More imaginative thinking that says "here conditions are right for the accumulation of oil" is needed. This of course does not mean that a do-or-die attitude should be adopted for that quarter section with a thoroughly tested dry hole in the middle of it; reference is made to those many wide-open spaces and unchecked formations in the United States that have yet to produce their first drop of oil.

There need be no doubt about the future of oil finding in this country so long as the positive approach to the search continues to gain adherents. Such an approach combined with the technological developments that permit more and more detailed work will find oil just about everywhere.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

SOUTH DAKOTA . . . Shell Oil Co. 1 State A, SW SE 9-21n-4e, Custer area wildcat in Harding County has made additional oil, with some water, on test in the Red River. Recovery on a 1-hour test of the zone 8,715-45 ft. with ½-in. chokes was 270 ft. of gas cut 29.3°-gravity oil, 180 ft. of mud-cut and gas-cut fluid one-half oil, 450 ft. of slightly oil and gas-cut muddy water and 970 ft. of water.

UTAH . . . Three States Natural Gas Co. has reported recovery of 41°-gravity oil from the upper Paradox (Pennsylvanian) at 1 Utah State, C SE SW 32-29s-23e, in the Bluff unit of San Juan County. The highly important test is drilling below 6,170 ft.

COLORADO . . . The Texas Co. has recovered 2,650 ft. of free oil and 200 ft. of oil-cut mud on a 2-hour test of the Shinarump (Triassic) at 14 Knowlton Lot 5, 9-4n-91w, Moffat County. The Moffat Dome deep pool test is coring below 5,301 ft. and will test to the Morgan (lower Pennsylvanian) at about 6,300 ft.

MONTANA . . . Shell Oil Co. has recovered additional oil and gas shows at their Cabin Creek confirmation, 11-33 NP, C NW NW 33-10n-58e, Fallon County. A drill-stem test at 7,066-7,146 ft. has gas in 4 minutes at the rate of 2,000 M.c.f. daily, increasing to 2,550 M.c.f. per day after 1 hour of the 2½-hour test.

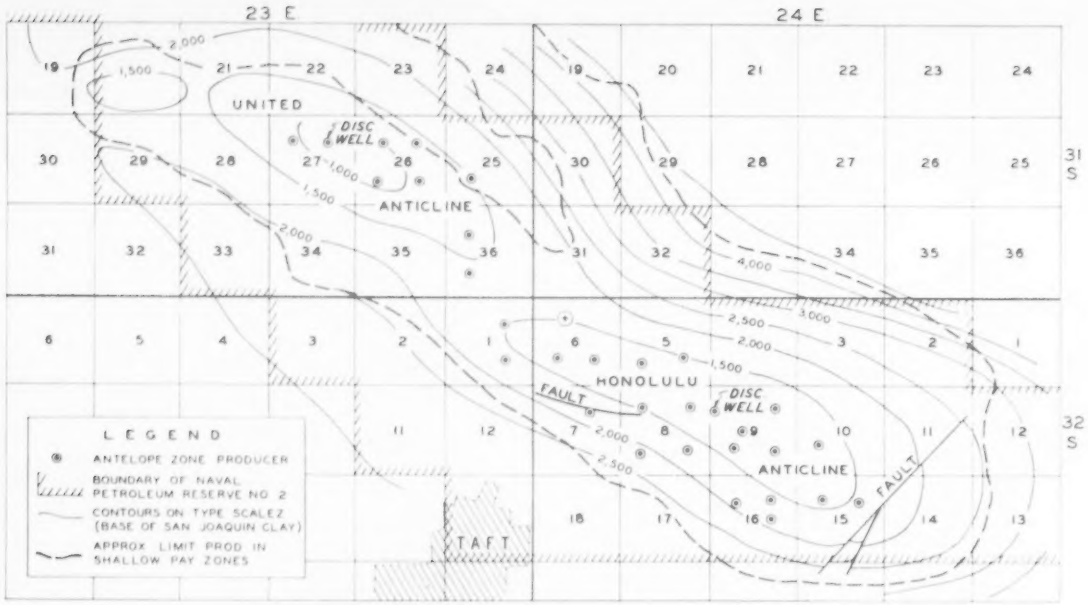

Fig. 2—The Buena Vista Hills structure as contoured on the type Scalez marker, showing extent of development of the Antelope fractured shale zone. (Map based on that presented on pp. 246 and 247, A.A.P.G. Guidebook, March 1952.)

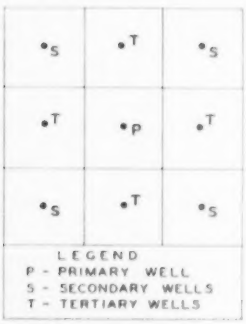

Fig. 1 — Agreed development plan under which the Antelope pool has thus far been developed leads to an ultimate spacing of one well per 17.7 acres.

Development of Antelope Shale Halted by Uneconomic Spacing

This Buena Vista Hills (California) reservoir closed down while negotiations concerning unitization and well spacing are pending

by D. H. Stormont

FACED with a development program which would result in more than 100 probably uneconomical wells being drilled, operators in the Antelope fractured-shale pool of Buena Vista Hills field have temporarily halted drilling activity.

The pool, located near Taft in westside San Joaquin Valley, was discovered in March 1952. It contains 31 producers in a semproved area of about 5,000 acres. With but two exceptions, all wells have been drilled near the center of 160-acre drilling units.

This well-spacing plan is in accordance with agreements entered into by the operators and the Navy Department. The latter administers activity on government lands, consisting of alternate sections throughout the field which has been designated Naval Petroleum Reserve No. 2. The agreements were adopted in 1937 to regulate development of any deeper pays that might be discovered.

According to the agreed development plans, a primary well first was to be drilled in the center of each quarter-section. Four secondary wells then would be drilled at the corners of the 160-acre drilling units to establish a density of one well per 33.3 acres (see Fig. 1). Later four tertiary wells then would be drilled to arrive at a density of nine wells on each 160 acres.

The reservoir being developed is a cherty, fractured-shale zone, coatining very thin sections of sand in areas. Average thickness is about 900 ft.

Practically no experience has been had with fractured-shale pays in San Joaquin Valley so there is no basis for estimating recoveries. It is believed, however, that the Antelope will not economically justify development to the ultimate 17.7-acre well density The secondary-well plan is more in keeping with anticipated recoveries but it results in unequal well distribution. Accordingly the operators are attempting to change the development plan before proceeding further.

At the same time effort is being made to unitize the pool to permit development more in line with the reservoir's spotty nature. More productive areas would be drilled to a greater density than are the less-productive portions.

Largest acreage holder in Buena Vista Hills field is Standard Oil Co. of California. It owns alternate sections not held by the U. S. Government. Standard's wholly owned subsidiary Murvale Oil Co. also holds leases on a few sections. Honolulu Oil Corp. has the second largest holdings. Others include Tide Water Associated Oil Co., General American Oil Co. of Texas, and Kern Oil Co., Ltd.

Status of Development

Development during the past 1½ years has shown that production in the Antelope extends from the southern Honolulu anticlinal structure to the United anticline on the northwest edge. A dry hole was drilled in the intervening saddle area, as shown in Fig. 2, but production is continuous based on the current 160-acre well spacing.

The structure reflected in Fig. 2 is on the type Scalez fossil marker, above the shallower Pliocene producing zones. The Antelope zone is topped at depths of approximately 3,500 to 4,500 ft. The fractured-shale pay is stratigraphically equivalent to the Stevens zone, upper Miocene, which produces at fields east of Buena Vista Hills.

Discovery well on the Honolulu dome was Standard 503 9-D in NW 9-32s-24e. It was completed in March 1952, flowing 198 bbl. of 31°-gravity crude through a 27/64-in. choke and with perforations at 3,535-4,398 ft. Standard already had 552 27-B under way in NE 27-31s-23e to test deep possibilities of the United dome. After being drilled to 11,212 ft., it was plugged back and redrilled to 4,870 ft. In May 1952 it was completed pumping 109 bbl. of fluid, cut 24 per cent, through perforations at 4,150-4,868 ft.

Subsequent development has shown the fractured-shale zone to be quite spotty, good flowing wells being offset by small pumpers. Amount of section opened to production varies from about 500 ft. to more than 1,400 ft., with the average being about 900 ft. Gravity of the crude varies from about 26° to approximately 36°.

Based on the 31 wells completed to date the Honolulu dome appears to be the more productive. Of the nine producers on the United dome, seven were completed as pumpers. About half had initial productions of less than 50 bbl. daily, accompanied by high water cuts.

Of the 22 producers on the Honolulu structure, about three-fourths had initial productions in the range of 200 bbl. daily and higher. Several were completed flowing more than 350 bbl. daily through approximately ¼-in. chokes. A few, however, pumped only 10 to 40 bbl. daily.

No data are available on the performance of these Antelope producers, which the Conservation Committee of California's engineering committee has assigned an M.E.R. of 100 bbl. daily. Last January, with 16 wells on production, average output was 180 bbl. daily. Average cut at that time was 11.3 per cent. In August, when 30 wells were producing, output averaged 125 bbl. daily plus a 23 per cent cut. Bulk of the 55 bbl. decline in average production, however, is accounted for by the fact that 9 of the 14 wells completed during the period had initial productions of less than 75 bbl. daily.

Only two producers, one of which was a redrill, have been completed since July. The other was completed last month, when Kern Oil Co., Ltd., completed a second well on its 160-acre lease in 16-32s-24e. This producer had an initial production of 345 bbl. daily, flowing through an 18/64-in. choke. The well was completed 6 months after its first producer was completed, flowing 408 bbl. daily through an 18/64-in. choke.

The Antelope zone probably will receive little additional development while negotiations concerning unitization and well spacing are pending. If unitization is agreed upon and full-scale drilling resumed, possibly as many as 150 new producers may be added in completing development of the zone.

CANADA

Five Strikes Recorded in Area in 7-Day Period

There were another five discoveries recorded in western Canada during the past 7-day period, including two that found crude oil and three that gave up natural gas during drill-stem tests.

Alberta accounted for three of this week's strikes, two natural gas and one oil, while Saskatchewan produced one oil discovery and one new gas find. The Alberta oil discovery this week was made by the Seaboard-Honolulu-Merrill-Cancoll team in the Sylvan Lake-Bentley area of central Alberta, 95 miles north of Calgary and 13½ miles southwest of Rimbey area D3 reef oil production. The light-gravity crude flowed from the Viking sand following perforations opposite that pay zone that was found following the running of a log. This well had also been chalked up as a wet gas discovery in the basal quartz (below the Viking) earlier this year.

The dual zone discovery, Seaboard 10-4 Sylvan Lake, LSD 10, 4-41-3w5, was perforated in the Viking interval 6,232-37 ft. Following an MCA treatment with 500 gal., the well flowed at the rate of 456 bbl. of 36°-gravity oil through a ¾-in. choke. An extended test period is now under way, in an effort to determine the well's initial potential.

One of the two Alberta gas strikes this week was made by Imperial and Canadian Superior of California, at a wildcat near Buck Creek, 56 miles southwest of Edmonton and 10 miles east-northeast of the Socony-Seaboard group's Pembina area Cardium sand oil discovery. This strike, Imperial-Canadian Superior 14-29 Buck Lake, LSD 14, 29-48-6w5. During a 30-minute drill-stem test in the interval 2,871 ft. to 2,941 ft., the well flowed natural gas at maximum rate 5,010,000 cu. ft. daily. Pipe recovery was 10 ft. of drilling mud. Coring and testing is continuing.

The other Alberta gasser was drilled by Northern Development Co., Ltd., on farmout lands from Union Oil Co. of California, in the Armelgra area, 40 miles west of Medicine Hat and 55 miles northeast of Lethbridge.

Gas at this wildcat, Northern-Union 4-9 Crown, LSD 4, 9-13-13w4, came from the Bow Island during drill stem test of the interval 2,298 ft. to 2,313 ft. Gas flowed in 2 minutes, at rate of 2,500,000 cu. ft. daily. Test 9 ft. below that interval did not yield any gas, but gave up only formation water. Well is now heading for its Madison objective, and is drilling below 3,090 ft.

Saskatchewan . . . H. Merlyn Christie, Ltd., and Edoran Oil Corp., Ltd., discovered heavy-gravity crude oil at their second exploratory well in the Biggar area, 60 miles west of Saskatoon.

The 16°-gravity crude came from the Blairmore formation at the Edoran-Christie 2 Biggar venture, which lies on LSD 7, 12-36-15w3. The Blairmore was topped at 2,410 ft., and test in that zone gave up 330 ft. of oil and oil-cut mud, no formation water. String of production casing was being run at latest report.

Phillips Petroleum Co. of Oklahoma and Husky Oil & Refining, Ltd., are the joint owner's of the new southwest Saskatchewan natural gas discovery well. This wildcat strike, Phillips-Husky 1 Glidden, LSD 7, 14-27-24w3, 3 miles northeast of Eatonia area heavy oil discovery well, found its gas in the Viking. It lies 18 miles southwest of Brock area natural gas production and 12 miles southwest of Kindersley. Initial test in top of the Viking was run from 2,268-80 ft. for 30 minutes. Natural gas flowed in 1 minute, at estimated rate 4,000,000 cu. ft. daily, and there was no fluid in the pipe when it was pulled. The well is being deepened.

EASTERN CANADA

Ontario . . . Interest in the oil possibilities of Lambton County has been revived by Imperial Oil's discovery well on the Gordon Hollingsworth farm, on Concession 12, Warwich Township near Watford. Production comes from the Guelph-Niagara formation at 1,860 ft. and the well has been flowing 130 to 140 bbl. a day, making it probably the largest oil producer in Lambton since the decline of the Petrolia shallow field. A second well, about a quarter mile from the discovery, has secured good initial showings in the same horizon, and two other wells are drilling within the same radius of the discovery.

Supplementing work carried out jointly 2 years ago by Union Gas Co. and the Ontario government, seismographic crews will carry on a survey for Imperial along Concession 12 north of Sideroad 2, and if the early completions hold up, systematic development of the lower horizons will be undertaken.

In Raleigh Township, Kent County, a water well drilled by George Rice on the Charles Peltier farm near Fletcher encountered a strong flow of gas, accompanied by water, at about 80 ft.

Gaspe.—In the Gaspe peninsula, Quebec province, The 2 Bald Mountain is below 5,968 ft., sidetracking lost tools after cementing. Continental 1 deep test, on the Galt Brook dome is resuming from 3,226 ft. after recovering lost tools. The 1 Asphalt Base, on the same structure, is deepening below 1,902 ft., and maintaining oil flow from the upper horizon, at around 1,196 ft. The 1 Tar Point, shut down waiting for control equipment, is producing gas from 7,069 ft.

ILLINOIS

Four new oil pools and two extensions to pools were discovered in Illinois during October.

New pools were Patoka South in Marion County and Huey South in Clinton County,

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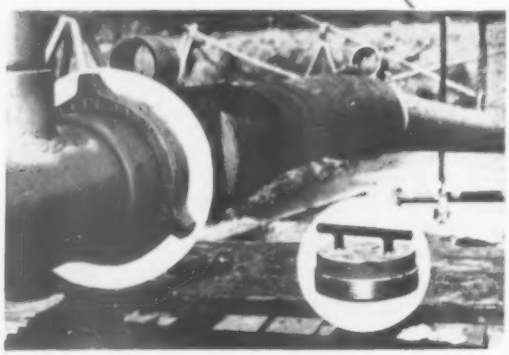

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both producing from Cypress sandstone, Louisville North in Clay County, producing from Aux Vases sandstone, and Posen North in Washington County, producing from Trenton limestone. Extensions were reported to Cantrell South pool in Hamilton County and Raleigh pool in Saline County. Thirteen wildcat wells were drilled more than 2 miles from production, all of them unsuccessful. Forty-nine wildcats drilled less than 2 miles from production discovered three of the new pools and one extension. The other new pool and one extension resulted from reworking wildcats drilled less than two miles from production which had previously been completed as dry holes. One hundred and thirty-seven oil wells were completed in pools.

William D. Griffin and Marvin Walker 1 Hoelscher, SE SW NE 33-8n-7e, 6 miles southeast of Effingham and 2½ miles from other production in Effingham County, gassed in 16 minutes and flowed natural clean oil in 40 minutes on a drill-stem test of the O'Hara lime at 2,604-17 ft.

Six miles southwest of Carmi in White County W. C. McBride, Inc., is coring ahead at the 1 John Jacobs et al, SE SW NW 24-5s-8e, after topping saturated Cypress sand at 2,840 ft. This 1-mile test probably will open a new area in White County.

KANSAS

New Pool for Finney County Indicated

W. L. Hartman 1 Holsted-Thompson, SW SW SW 25-22s-33w, Finney County, appears to be a new oil pool along the northern edge of Hugoton gas field. A drill-stem test in the Marmaton at 4,378-4,410 ft. recovered 175 ft. of oil and gas-cut mud with 1,025 psi. bottom hole pressure. Another test at 4,400-10 ft. recovered 90 ft. of oil with 1,020 psi. On test at 4,435-60 ft. recovery was 1,110 ft. gas, 150 ft. slightly oil-cut mud, 60 ft. heavily oil-cut mud and 120 ft. muddy oil. Bottom hole pressure was 1,075 psi. This new strike is 1½ miles east of new Finnup pool.

Testing Under Way at New Flowing Pratt Strike

Rine Drilling Co. et al will test at a flowing oil discovery 4 miles west of Moore Southwest pool in the northwestern part of Pratt County.

The 1 Gereke, SW NE SE 12-26s-15w, reported a heavy oil flow after 52 minutes from the Viola lime on drill-stem test at 4,381-4,400 ft. Bottom hole pressure was 1,485 psi.

MICHIGAN

An interesting Dundee dolomite section was tested at the Don Rayburn 1 Meyer, N½ NE SE 25-20n-3w, Franklin Township, Clare County. This test well is scheduled to be drilled to the Detroit River and Richfield oil pay horizons.

Dundee top was logged at about 3,844 ft. Oil and gas showed on a drill-stem test run at 3,842-51 ft. Tester was one for 1½ hours. The well started to blow as soon as tester was opened. Gas showed in 25 minutes. Test recovered 100 ft. of mud-cut oil, 210 ft. of oil and 10 ft. of salt water. Pressure was gaged at 355 psi. in 15 minutes.

Previously a test of the Traverse at the 1 Meyer showed encouraging results. First drill-

stem test, at 3,105-15 ft., showed 150 ft. of clean oil in 1 hour. Gas showed to the surface in 15 minutes. A second drill-stem test in the Traverse, at 3,105-35 ft., showed 2,100 ft. of water, oil and gas-cut drilling mud and some free oil. Gas showed at the surface in 40 minutes. The Rayburn 1 Meyer is the north 40-acre offset to an older Detroit River "sour zone" discovery well which is now abandoned.

A wild, uncontrolled oil and gas flow from the Traverse at Otto Carlson & Max Groom 1 Charles, SW SW NW 23-12n-14w, Sheridan Township wildcat, Newaygo County, fired early November 9, and completely destroyed drilling rig. No one was injured. Well killed itself after flowing and burning uncontrolled for 4 hours. It was feared, although it was not definitely determined, that bottom-hole water encroachment had snuffed out the blaze. Wildcat, located about 3 miles east of the Bishop Traverse oil pool, logged Traverse lime top at 2,209 ft. and went out of control at 2,210 ft. New drilling rig was scheduled to be moved to well-site by Mackey Drilling Co., cable tool sub-contractor.

OKLAHOMA

Garvin Wildcat Has Good Hourly Flow

Stanolind Oil & Gas Co. 1 House "B," SE SE SE 2-1n-3w, northwest of Eola pool in Garvin County, flowed an estimated 35 bbl. of oil per hour on drill-stem test on open hole below casing. The test was made at 10,708-938 ft., top of basal McLish called at 10,920 ft. Another core is being taken. At 7,500-51 ft. in the Hunton lime the well flowed oil in 195 minutes at the estimated rate of 30 bbl. per hour.

Northwest Part of East Payson Pool Develops

Lincoln County's prolific East Payson pool is expanding with good results to the northwest. The latest completion is W. C. McBride 4 Covey-Newman unit "B," SW SW NE 35-13n-4e, finaled from perforations at 4,141-56 ft. for 67 bbl. of oil per day from the Skinner sand.

In Payson townsite H. L. Berkey has casing to 4,228 ft. at 1 Markwell, SW SW SW 35-13n-4e. The 1 Nicely, SW SE SW 35 is going on the pump. On swab tests of perforations at 4,133-37 and 4,139-49 ft. the well gaged 141 bbl. of oil in 13¼ hours.

Committee Names Ten New Pools in State

The Oklahoma Nomenclature Committee of the Mid-Continent Oil & Gas Association has named 10 new producing areas in the state.

Middle Peck pool is a new Lincoln County area, opened by Puckett Drilling Co. 1 Harlow, SW NW NW 34-14n-6e. In the SE SE SW 22-17n-2e, West Perkins is a new pool at C. H. Mee 1 Turner. South Tonkawa is a new pool at Northern Plains Petroleum Co. 1 Murray, SE NW NE 25-24n-2w, Noble County. Southeast Clearview was opened by Jones & Shelburne 1 Douglas, SE SE SE 32-11n-11e, Okfuskee County.

Plateau Development Co. 1 Replogle, Okfuskee County, opens Northwest White Rose pool in the NW SW SW 10-13n-9e. In Osage County Kewanee Oil Co. 1 Osage, NW NW NW 19-25n-7e, opens Southeast Little Chief pool. Southeast Orlando is a new Payne County pool at Davon Oil & Gas Co. 1 Bode, NW SW NW 14-19n-1w. East Indianola is a new gas pool in Pittsburg County at Atkinson & Adkins 1 Alley, SW SW NW 17-8-15e.

Northeast Eva pool is one of the most important discoveries of the last few months in Texas County at United Producing Co. 1 Kelley, C SE NE 2-4n-10eCM. Northeast Purdy and East Purdy pools in Garvin County have been combined into one pool, Northeast Purdy.

Good Well Completed In Osage County Area

Kewanee Oil Co. 1 Osage, NE NE NE 24-25n-6e, is a good well south of Northeast Little Chief pool in a new producing area.

The well flowed 514 bbl. of oil in 24 hours from Burbank open hole at 2,811-59 ft. This new well is just west of the discovery well in the new area. The second dry hole is announced at the 5 Osage, SE NW NW 19-25n-7e, on the southeast edge of the pool.

Renewal in Garfield County Flows at High Hourly Rate

Marshall sand and Wilcox sand pay has been proved at F. L. Bishop et al 1 Wilcox, SW SE NW 19-23n-3w, Garfield County renewed dry hole.

The well last year revived North Garber pool development, having been the west offset to an abandoned producer.

Bailing netted ¾ bbl. of oil per hour for 10 hours without treatment in the second Wilcox sand at 5,358-62 ft. Bailing gave up 1½ bbl. of oil per hour natural in the Marshall zone at 5,310-24 ft. The Marshall

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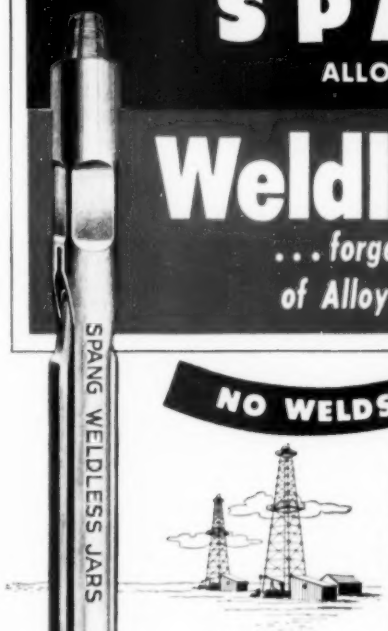

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zone got fracture treatment, but the formation didn't take all of the sand. After swabbing to clean the hole the well kicked off and flowed 50 bbl. of oil per hour through the casing.

ROCKY MOUNTAIN

SOUTH DAKOTA

Harding County Discovery Has New Oil Show

Shell Oil Co. recovered oil and some water from a second zone at 1 State A, SW SE 9-21n-4e, Harding County, South Dakota.

Test of the zone 8,715-45 ft. recovered 270 ft. of gas cut oil, 29.3 gravity; 180 ft. of mud and gas cut fluid, about 50 per cent oil; 450 ft. of slightly oil and gas-cut muddy water and 970 ft. of water.

Tool was open 1 hour through ½-in. choke. The recovery is also believed from the Red River of Ordovician age which showed the first indication of commercial success in South Dakota a week ago with recovery of 570 ft. of free oil from the zone 8,589-8,604 ft. Shell is reported drilling ahead below 8,745 ft.

A core following the first test was not encouraging and the cored interval was not tested. The additional shows reported have increased South Dakota enthusiasm considerably among those interested in the area.

The first commercial gas well in 20 years for North Dakota is indicated in tests of a shallow well, the 1 Brudvik, Renville County (A on map). Apparently commercial gas was found at 302-303 ft. Shell Oil Co. reports the first apparent commercial shows in South Dakota at its wildcat, the 1 State A, SW SE 9-21n-4e, Harding County (B on map). The wildcat has made additional oil, with some water, on test in the Red River. Recovery on a 1-hour test of the zone at 8,715-45 ft. with ½-in. chokes was 270 ft. of gas-cut 29.3°-gravity oil, 180 ft. of mud-cut and gas-cut fluid one-half oil, 450 ft. of slightly oil and gas-cut muddy water and 970 ft. of water.

COLORADO

New Pay Found in Moffat Pool

The Texas Co. recovered 2,650 ft. of free oil and 200 ft. of oil cut mud on 2 hour test of Shinarump from 5,273-5,301 ft. at 14 Knowlton, Lot 5, 9-4n-91w, at Moffat dome, Moffat County. The well is to test to Pennsylvanian in the pool which has had no previous penetration below Entrada.

Tool was open for 2 hours on the test of

Arrow points to Mountain Fuel Supply Co. 1 Government, SE SW NE 9-11n-101w, in the Sugar Loaf area of Moffat County. Maximum recovery reported on any single drill-stem test was 4,670 M.c.f. of gas per day from the Mesaverde. The discovery further justifies the considerable exploratory work under way to the Mesaverde in the Green River basin areas of Colorado and Wyoming.

Shinarump. Flowing pressure was 100-1,000 psi., and oil recovered was 37.2 gravity.

Small amounts of Shinarump production were found at Rangley, but the formation has not been noted as a substantial producer. Numerous shows in the formation in Utah have proved non-commercial. The Moffat dome show is considered an excellent performance for this formation in comparison with tests of Shinarump elsewhere. The operator is reported coring below 5,301 ft. and expects to test Pennsylvanian at about 6,300 ft.

New Morgan County Discovery Tested

Drill-stem test of the "D" sand from 5,657-88 ft. at Bill Tomberlin's 1 Cochran SE SE NW 12-1n-58w, Morgan County, recovered a flow of oil reported at 10 bbl. per hour, with the flow by heads. The well is north of the recent Morgan County discovery at 1 Clar, SE NE NW 24-1n-58w, which was the first recent success in the southwestern Morgan County area.

Tomberlin has not released sample tops, and is reported running logs at total depth of 5,725 ft.

This area of Morgan County is north of the Little Beaver and Badger Creek fields in Washington and Adams counties, and has already become the center of interest for what promises to be a new area of rapid development, possibly of the same nature as that at Little Beaver.

NEBRASKA

West Sidney Wildcat Recovers Oil

Ohio Oil Co. recovered oil on drill-stem test of the "D" sand at 1 Fleming, NE NE NW 28-13n-50w, in the west Sidney gas area. Test of the zone 4,800-25 ft. recovered 2,400 ft. of oil with tool open 45 minutes. Flowing pressure was 425-800 psi., and shut in pressure was 1,150 psi. The operator will test "J" sand before completion.

The well is on the southeast side of the previously established gas producing area, where both "D" and "J" sands have had commercial gas discoveries. There is no oil production nearer than the Nichols and Doran Farms pools about 5 miles to the north.

The discovery adds new speculation to the question of whether the 10 or more "discoveries" in the gas area are separate pools, or whether the area should be regarded as one field. Ohio has consistently classified wells in the area as wildcats, and the oil discovery at about the same depth as gas production is usually found helps this point of view. Other observers have been inclined to lump the entire area together.

Enders Deep Test Fails

Twin Oil Co. and Rock Hill Oil Co. have set pipe for completion in the Cretaceous "J" sand at 4 Werde, NW SE NE 15-13n-55w, in the Enders pool, Kimball County. The well was a test of the Lyons (Permian) sand. The Lyons was found well developed, porous, permeable, and produced salt water. Total depth is 7,535 and casing has been landed on bottom, but will be perforated for "J" sand production.

Converse County Discovery Tested

Union Oil Co. of California has released details of a deep test in the southern end of the Powder River Basin. The company tested 1 Unit, NE NE 4-40n-76w. Test of the Sussex sand interval 9,501-74 ft. had gas at the rate of 8,000,000 cu. ft. per day, with the blow diminishing to about 1,000,000 at the end of the test. Tool was open 18 hours. Recovery in pipe was 720 ft. of light green

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oil, 360 ft. of oil and gas cut mud. Flowing pressure was 410-418 psi.

Union is coring below 9,938 ft. on the wildcat which is to test to about 13,000 ft. It is the first test of the Powell unit assembled by this operator in 1952.

MONTANA

Cabin Creek Offset Testing

The second well in the Cabin Creek area where Shell Oil Co. completed the discovery for a two-formation gage of 4,235 bbls. of oil daily, is now testing. Shell Oil's 11-33 NP, C NW NW 33-10n-58e, Fallon County recovered gas at the maximum rate of 2,500,000 cu. ft. per day on drill-stem test 7,066-7,146 ft. Tests below this depth recovered slight shows, and a test from 7,285-7,350 ft. recovered 370 ft. of very gassy, muddy oil. Recovery also included 60 ft. of slightly gassy mud with some oil, and had a flowing pressure of 70-160 psi. Total depth is 7,400 ft. and Shell is continuing to test. Tops have not been released. However, gas was recovered in apparently commercial quantities from upper Charles in the Cabin Creek discovery.

Richland Wildcat Test Located

Eramont Petroleums, Ltd., Trans Era Oil, Ltd., Albermont Petroleum, Ltd., and the Northern Pacific Railway Co. have made location for 1 NP, C SW NW 21-23n-54e, in the Enid area of Richland County. It will test to Ordovician at about 11,000 ft. There has been no previous drilling in the area.

UTAH

Paradox Basin Wildcat Has Oil Show

Three States Natural Gas Co. has confirmed reports of recovery of 41 gravity oil at 1 Utah State, C SE SW 32-29s-23e, in the Bluff unit, San Juan County, Utah. The operator has not reported details of tests, but termed shows encouraging. A substantial section of Paradox (Pennsylvanian) with shows was reported, but tops and interval tested and other details have not been released. The operator is reported drilling below 6,170 ft.

The wildcat is 1 mile south of the first test of this unit, drilled by Shell Oil Co. as unit operator in 1951 at 1 Unit, NW NW NE 32-29s-23e. This well had shows in several zones, and flowed 50 bbl. of oil in 11½ hours from the Mississippian interval 7,520-36 ft., but later testing proved it non-commercial. In the Shell well, Paradox was topped at 5,940 ft. and carbon dioxide was recovered on test of the formation.

The well, if a commercial discovery, is regarded as one of the most potentially important in the Rocky Mountain region during the year. A considerable amount of leasing, with much study and some planned exploration has been apparent in the Paradox basin during recent months. There has been no substantial previous exploration in the area.

KENTUCKY

WESTERN KENTUCKY

The most important wildcat drilling in the Tri-State area is Ellis-Morrison-Damron-Gary and Sun Oil Co. 1 Howard, 9-N-25, McLean County. The discovery flowed 48 bbl. of oil per hour natural from the Rosiclare lime at 2,372-78 ft. after perforation. The ½-mile outpost, which is 5 miles northeast of Sebree, is currently flowing more than 28 bbl. of oil per hour.

EASTERN KENTUCKY

In Elliott County and located on Rocky Branch, Duquesne Oil & Gas Co. has completed 2 J. H. Fraley for an initial potential of 16 bbl. of oil daily from the Weir sandstone at a total depth of 807 ft. Pay was logged and shot from 762 ft. to 797 ft. Well is located in Burke Dome pool.

Further south in the county Duquesne has also completed 9 D. M. Oliver on Newcomb Creek for a 40-bbl. well in the Weir sand 966 ft. to 994 ft. with total depth of 999 ft. Well was shot with 115 qt. of nitroglycerin.

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LOUISIANA

NORTH LOUISIANA

Two Wilcox Discoveries Reported in East Area

Hunt Oil Co. and Gulf Refining Co. have completed the discovery well of West Elm Ridge field in LaSalle Parish. The strike flowed 141 bbl. of 42°-gravity oil per day through 9/64-in. choke. The 91 Louisiana Delta Hardwood Lumber Co., Inc., C NE SW 33-6n-4e, is producing from Wilcox sand through perforations at 4,742-46 ft. The strike is 3¼ miles southwest of old Elm Ridge field, now abandoned.

The 94 Louisiana Delta, C NE NW 33-6n-4e, ½ mile north of the discovery well, is the confirmation test under way.

Near Larto Lake in Catahoula Parish Marine Oil Co. is waiting on tanks to take production tests at 4 Farrar, C NE NW 18-5n-6e, new Wilcox discovery 1½ miles north of nearest production. The well flowed clean oil from perforations at 5,725-28 ft. Production is from a 2-ft. Wilcox sand stringer at 5,726-28 ft.

SOUTH LOUISIANA

Oil Producer Completed In Deer Island Gas Field

First oil production for Deer Island field, in Terrebonne Parish, has been established with the completion by Union Producing Co. of its 3-B Continental flowing 356.76 bbl. daily through 6/64-in. choke. Gravity of the oil was 36.4°. Flowing pressure gaged 5,055 psi., and gas-oil ratio was 1,712 cu. ft. per barrel. Previous production in the field has been gas.

Producing horizon, open through casing perforations at 11,527-31 ft., is a new and deeper pay zone for the field. Gas production has been from zones at 9,565-90 ft. and 10,005-29 ft.

Gas-Condensate Tested In Bayou Long Wildcat

Continental Oil Co. is continuing tests of its new gas-distillate discovery well in the Bayou Long area of St. Martin Parish. The well, 1-B Jeanerette, located in 11-13s-11e, flowed 9 bbl. of 43°-gravity condensate on a 60-minute gage through 12/64-in. choke with gas flow estimated at the rate of 5,000,000 cu. ft. per day. Shut-in pressure on the tubing built up to 4,550 psi.

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Tests are of a sand open through a casing-perforated interval at 12,464-500 ft. Hole had been drilled to 13,025 ft. and casing run to 12,734 ft. Nearest other production is 6 miles to the west in Bayou Pigeon field.

Deep St. Landry Wildcat Produces Gas-Distillate

Sinclair Oil & Gas Co. and Atlantic Refining Co. are opening what appears to be another important gas-distillate productive area for coastal Louisiana. Their indicated discovery well, 1 Brewster-Nienstadt, located in 21-4s-6e, 8 miles northeast of the multi-pay Washington field, in northeastern St. Landry Parish, is testing a deep sand, open through casing perforations at 11,128-34 ft.

A preliminary drill-stem test of these perforations with ¼-in. top and bottom chokes flowed at the rate of 290 bbl. of 54° gravity distillate daily with estimated gas volume of 1,100,000 cu. ft. Flow was under pressure of 2,590 psi.

Two previous tests, taking in intervals of open hole below the casing, cemented at 11,331 ft., also got substantial gas-distillate flows but showed some water. Hole since has been plugged back into the casing. Original total depth was 11,651 ft.

TEXAS

WEST TEXAS

Andrews Wildcat Finds Additional Strawn Pay

Forest Oil Corp. and Monterey Exploration Co. 1-C University, northeast of Andrews, ran another successful drill-stem test in lower Pennsylvanian limestone from 10,746-10,813 ft. Last week the well flowed oil on a test between 10,618-10,659 ft.

The test to 10,813 ft., open 2½ hours, recovered gas-cut water blanket, 1,260 ft. of heavily gas-cut mud, with a show of oil, 720 ft. of clean oil, and 1,080 ft. of oil and gas-cut mud. Operators were coring ahead.

Kerr-McGee 1 Means, east of Andrews, was waiting on orders at 10,032 ft., with prospects of being drilled ahead to test the Strawn.

Kent County oil show . . . Blanco Oil Co. and Newman Brothers Drilling Co. 1 Swenson, wildcat about 3 miles northwest of Salt Creek field, reported top on the Canyon at 6,102 ft. on elevation of 2,180 ft. Whether or not the Canyon section was reef was not specified.

Operators ran a 3-hour drill-stem test from 6,102-36 ft. which had flowing oil in 40 minutes. The flow was not gaged but observers estimated it to be as high as 15 bbl. an hour.

Midwest Oil Corp. has filed application to drill 1 Mary L. Reed as a 7,100-ft. wildcat in 2-2 H&GN Survey, approximately 1½ miles east and slightly north of 1 Newman.

Tom Green County . . . Republic Natural Gas Co. 1 Hair, discovery on the east side of San Angelo, has been completed for a flowing potential of 352 bbl. of oil a day. Initial potential was based on a 20-hour gage of 294 bbl. of oil through ¼-in. choke, from perforations at 3,300-10 ft. in Cisco limestone. The well was drilled to 6,200 ft. and oil shows in the Strawn and Wilberns.

Stanolind Oil & Gas Co. 1-A J. Willis Johnson (formerly A. P. Fuller), located south of San Angelo, flowed 73 bbl. of oil in 24 hours from perforations in Canyon sand at 4,640-54 and 4,664-68 ft., through 16/64-in. choke.

Cambrian gas in Schleicher test . . . Atlantic Refining Co. 1 Roberts, Schleicher County wildcat 25 miles southwest of Eldorado, developed a flow of gas estimated at 2,500,000 cu. ft. daily on a test from 7,150-7,254 ft. The gas was dry, and was gaged through ¼-in. choke.

NORTH TEXAS

New Conglomerate Prospect In Montague County

P-M Drilling Co., Wichita Falls, 1 T. M. Collier was showing for a good conglomerate discovery, and according to operators had logged from 35-40 ft. of pay section. Location of the well in the J. Collier Survey, A-1213, is 5½ miles southwest of St. Jo.

A drill-stem test from 6,345-60 ft. developed some gas in drill pipe and recovered gas-cut mud. Second test, open 105 minutes, was 6,650-68 ft. Gas hit the surface in 8 minutes and oil in 95, which tanked 7 bbl. of oil in 8 minutes. Operators were waiting on cement after setting casing.

On the east side of Montague Township, A. H. Bruner 1 Arami was drilling conglomerate at 6,485 ft. A test from 6,395-6,401 ft. recovered 10 ft. of drilling mud. However, a previous test in conglomerate from 6,076-83 ft. recovered 25 ft. of heavily oil and gas-cut mud.

Ranger sand discovery . . . Clark P. Chandler 1 Coates, Eastland County prospect southwest of Mangum, flowed oil at the rate of 50 bbl. daily through 16/64-in. choke from perforations between 3,298-3,316 ft. Gravity of the oil was 43° and flowing pressure was 520 psi.

In Knox County, Seaboard Oil Co. 2 Hamilton, 20-13-H&TC, had discovery production at 2,495-2,510 ft. A test of the section had flowing oil in 80 minutes which was estimated at the rate of 10 bbl. an hour. Location is 4 miles east of Buzzard Peak field.

Woodson Oil Co. 1 T. C. Harris, 3 miles south of Newton in Stephens County, was reported flowing oil at the rate of 6 bbl. hourly through 10/64-in. choke. The well was testing the Mississippian limestone between top at 4,290 ft. and 4,325 ft., total depth.

Development Spreads in New West Saratoga Area

Development in the new Yegua-producing area on the west side of the old Saratoga salt dome, in Hardin County, is being stepped up with the entry of American Republics Corp. and Houston Oil Co. of Texas.

The latter joint operators are starting a well approximately 480 ft. north of the area's discovery well, Michel T. Halbouty 1 Hooks and Graham, completed last May. The new operation, 1 Mary Hopkins fee, makes three now drilling in the area.

Three wells have been completed in the area, including the discovery well, producing from a sand interval at 5,821-90 ft.; its confirmation well, Halbouty's 1 Miles Taylor estate, southwest offset to the discovery well, completed last September; and Dorrance & Co., Inc., and W. R. Godsey 1-B Collins, northwest of the discovery well, completed early this month as a new-pay discovery in a sand interval at 7,432-52 ft. (also in the Yegua).

Halbouty currently is drilling at 1 Crow estate, 161-ft. southeast offset to Dorrance's and Godsey's deeper-pay discovery. Dorrance and Godsey are drilling at 1 Pemberton, 600 ft. northwest of Halbouty's discovery well, and have location for another well, 1 Collins.

TEXAS GULF COAST

Second Well Confirms Green Lake Production

Initial tests by W. B. Trammel and associates at their 1 Williams, a semi-wildcat in the Green Lake area of Calhoun County, in the lower coastal region, have virtually assured the area of its second producer. The indicated new well, 1,400 ft. northeast of the field's discovery, and until now only producer, flowed at an estimated rate of nearly 100 bbl. of oil per day on a test through 10/64-in. choke. Production is from a Marginulina sand with casing perforated at 5,971-86 ft. in hole drilled to 6,075 ft. The discovery well, Ryan Consolidated Oil Co. 1 Wagner, produces from an interval at 5,980-6,008 ft. The area is about 2½ miles east of Green Lake, in Manuel Lopez Survey.

New Oil Discovery Extends North Houston Production

Production of North Houston field, north of Houston, Harris County, has been extended approximately ¾ mile to the north with the completion by J. M. Huber Corp. and Columbian Fuel Co., joint operators, of their 1 Keng as an oil producer from the field's Yegua-sand pay-zone. On an unofficial test, the well flowed at a rate of from 4 to 5 bbl. of oil per hour through 10/64-in. choke with 700-psi. pressure. The well was drilled to 7,614 ft. but produces from casing perforations at 6,701-03 ft. The same operators already are drilling their second well, 2 Keng, 1,068 ft. east of the extension discovery. Location is in the WCRR Survey 25.

APPALACHIAN AREA

WEST VIRGINIA

In Glade district, Webster County, West Virginia, Gregory Gas Co., located another wildcat 1 J. W. Mills, elevation 2,325 ft., Cowen Quadrangle, .72 mile south of latitude 38 degrees 25 minutes and 3.35 miles west of longitude 80 degrees 30 minutes. Drilling in 1 D. D. Ellyson, is at a depth of 1,652 ft. Blue Sulphur district, Greenbrier County, Columbian Carbon Co. 1-1193 W. E. Hedrick wildcat is drilling in a bad hole at 1,952 ft., The 1-1192 C. Witt McClung, is at 2,334 ft.

OHIO

Mt. Zion pool was extended ½ mile to the northwest by a producer on the 1 Chas. Porterfield, Section 17, Jackson Township, Knox County. A small showing of oil in the Clinton at 2,820-2,864 ft., increased after fracturing to 60 bbl. in 24 hours.

In the northwest part of New Castle Township, Cochocton County, Oxford Oil Co. completed a nice well on 3 Howard Proper, Lot 22. Clinton at 3,140-3,204 ft. made a fair showing natural and 235 bbl. in 24 hours after fracturing.

An ad oitidnto Rine pool in Pike Township, Cochocton County, by Shuff and Bucy on 5 H. S. Mizer, made 385 bbl. in 24 hours after a fracture treatment. Sond at 3,070-3,126 ft. filled up 500 ft. in 15 hours natural.

Clinton Oil Co. 5 J. F. Smith, Lot 19, Hopewell Township, Licking County, along the north edge of an old pool, filled 200 ft. natural and increased to 220 bbl. in 24

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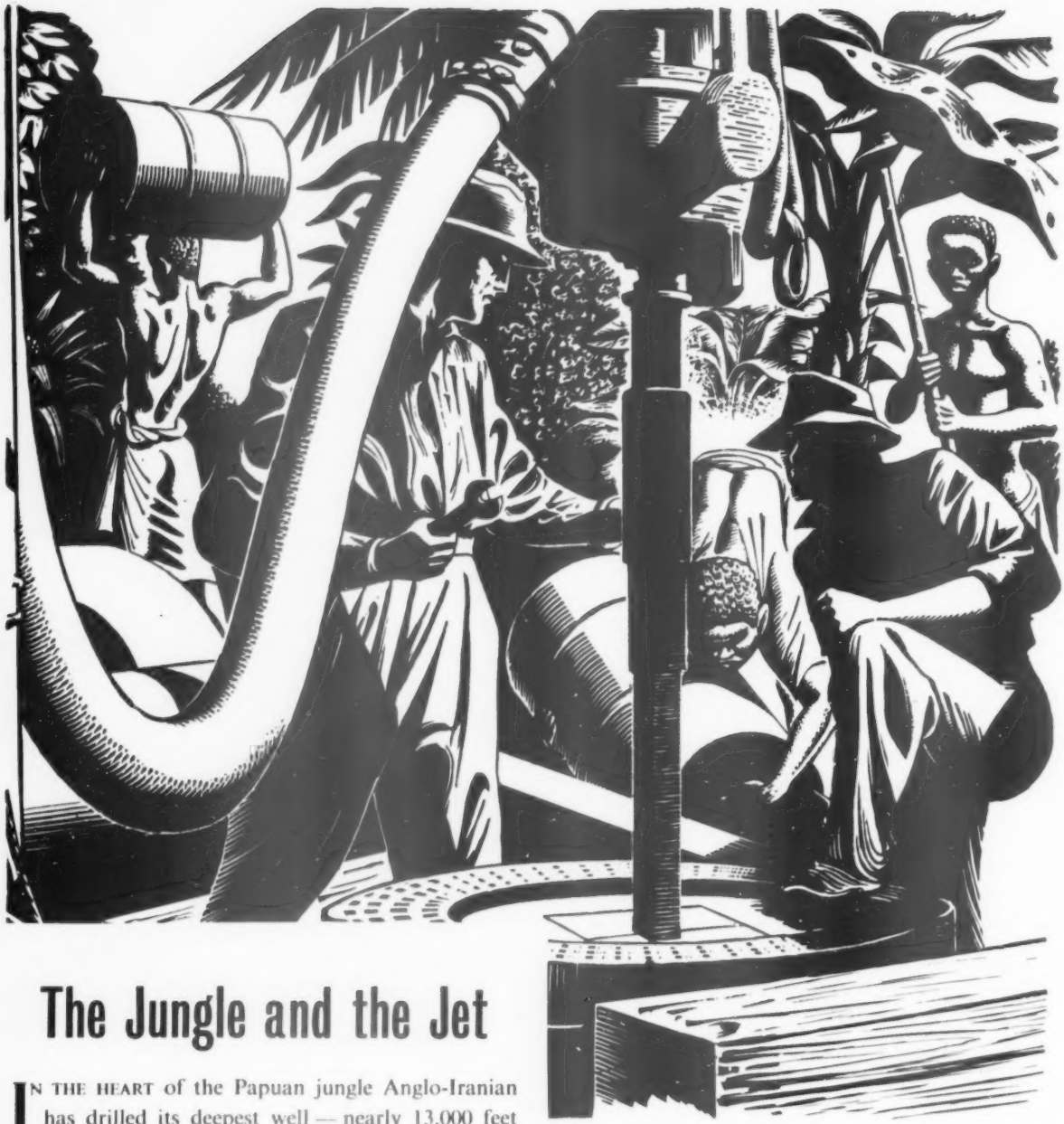

The Jungle and the Jet

IN THE HEART of the Papuan jungle Anglo-Iranian has drilled its deepest well — nearly 13,000 feet of it! In Sicily, East Africa and England, too, the search for oil goes on. Anglo-Iranian is finding the oil and refining it — turning it to use in a hundred ways, from fuel for jets to fruit tree sprays.

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hours after fracturing. Clinton sand was reported at 3,023-3,075 ft.

CALIFORNIA

Pipe Set in Richfield's Deep Coles Levee Test

Richfield Oil Corp. was preparing to test deep shows found in drilling its North Coles Levee test to a total depth of 17,895 ft., third deepest well ever drilled in California. Unlike the deep test being drilled by Ohio Oil Co. in the Paloma field 10 miles southeast, which failed to find Eocene rocks in drilling to the world's record depth of 21,482 ft., Richfield 67-29 C.L.A. will test these formations.

After running gamma ray, induction, and electric logs, 7-in. casing was set at 17,500 ft. This is believed to be the second longest string of such pipe ever set. Extent of oil shows encountered in the Eocene have not been released by the operator.

Testing San Benito Wildcat

With 7-in. casing set at 4,300 ft., Tide Water Associated Oil Co. was testing oil shows at 4,050-4,100 ft. in its wildcat 4 miles northwest of Hollister, San Benito County. Unconfirmed field reports credited 1 Breen with a flow of about 300 bbl. of fluid daily, cut approximately 40 per cent, through perforations at that interval. Location of the potential new field discovery is in SW NE 19-12s-5e.

Torrey Canyon Test Abandoned

The Texas Co.'s ½-mile west outpost to the Torrey Canyon field, Ventura County, was abandoned after oil shows encountered above the deep Sespe objective proved noncommercial. Drilled to 9,971 ft. in search of the thick Sespe pay being developed by Union Oil Co., 1 Hunter was plugged back to 7,560 ft. and 5½-in. casing set at 7,545 ft. Several days of testing yielded only water and mud. The company's first extension attempt ½ mile south of 2 Hunter also was a failure.

Simi Test Recovers Oil

Macson Oil Co. 1 Strathearn, about 1½ miles northwest of the town of Simi in Ventura County, yielded approximately 10 bbl. of light crude on swabbing tests. Pipe had been set at 2,715 ft. after hole had been bottomed at 2,828 ft. The wildcat, in 6-2n-18w, encountered the Sespe-Eocene contact at 216 ft. and then at 2,380 ft. drilled through a fault into Sespe formations again.

Alferitz Wildcat Testing

Carlton Beal & Associates 56-11 Kalloch, 2,000 ft. northeast of production in the Alferitz Anticline area of Kern County, may result in a fault-block pool discovery. With 7-in. casing cemented at 5,730 ft. and a packer set at 5,717 ft., 14 hours of swabbing in open hole above 6,700 ft. yielded 44 bbl. of light oil and gas-cut mud. About 1,000 ft. of oil and gas-cut mud was recovered when pipe was pulled. Following the test of the 800-ft. upper Eocene section, coring was resumed toward lower Eocene formations.

WILDCAT COMPLETIONS

SOUTHWEST TEXAS

Atascosa County: Petrocel Corp. and John B. Hawley, Jr. 1 Strzelczyk heirs, Blk. 41, Natascosa Colony Farm Lands. Dry. TD 7,515 ft.

E. M. Hailey 1 Climer, Bancroft Sur. 48, A-52. Dry. TD 3,264 ft.

Plymouth Oil Co. 1 Hindes, Luke Bryan Sur. 239, A-104. Dry. TD 2,180 ft.

Bandera County: G. L. Rowsey 2 Fee, J. M. Ship Sur. 13, A-1062. Standing. TD 6,970 ft.

Bell County: C. J. Foster Drilling Co. 1 McDaniel, E. P. Pulliam Sur., A-676. Dry. TD 1,700 ft.

C. J. Foster Drilling Co. 1 Tyler, O. T. Tyler Sur. 1, A-20. Dry. TD 1,720 ft.

Duval County: The Texas Co. 1-A DCRC NCT 23, GC&SF Sur. 279, A-1077. Dry. TD 3,011 ft.

Frio County: Howeth & Mason 1 Riggs et al, GC&SF Sur. 3, A-946. Dry. TD 3,667 ft.

Sutton Drilling Co. 1 Luckey-Tribble, Henry Castro Sur. 108, A-184.

Guadalupe County: C. R. England 1 Govett, J. G. King Sur., A-26. Dry. TD 2,331 ft.

Kenedy County: Humble Oil & Refining Co. 1 Clark & Sain, Santa Quiteria Grant. IP 1,380 M.c.f. daily and 35.4 BCPD, ¼-in., 55.9°, casing perforations 9,976-92 ft. TD 12,002 ft. (New field.)

San Patricio County: Kirkwood & Co. 1-D Ewing, Lot 3, Sec. 25, G. H. Paul Subd., Coleman Fulton Pasture. Dry. TD 8,515 ft.

Republic Natural Gas Co. 55 Rachol, M. M. Flores Sur. IP 214.96 BOPD, 9/64-in., 35.9°, lower Frio 8,494-8,504 ft. (casing perforations). TD 9,505 ft. (New pay in White Point field.)

Seaboard Oil Co. of Delaware 1 Barrier, Sec. 26, G. H. Paul Subd., Coleman Fulton Pasture. Dry. TD 9,010 ft.

Starr County: C. G. Glasscock 2-A Guerra, Share H-14-B, Las Cuevitas Grant. IPP 10 BOPD, casing perforations 2,047-53 ft. TD 2,100 ft. (New field.)

Val Verde County: Honeycutt & Thomas 2 Honeycutt & Thomas, I&GN Sur. 9. Standing. TD 810 ft.

Williamson County: Corpus Christi Refining Co. 1 Fagg, T. E. Shell Sur., A-557. Dry. TD 2,880 ft.

Wilson County: Morris Cannan 1 Ploch, Claiborne Rector Sur. 134. Dry. TD 3,104 ft.

Zapata County: Rock Hill Oil Co. and T. C. Huddle 1 Ramirez, Blk. 10, S. T. Phelps, Jr., Subd., Share A, Villa Grant. Dry. TD 2,500 ft.

J. W. Gorman 1 Marrs McLean, Blk. 5, Walters Subd., Blas Maria Grant. Dry. TD 2,108 ft.

TEXAS GULF COAST

Brazoria County: Jack W. Frazier et al 1 Milks, HT&B Sur. 177, Block 65, A-285. Dry. TD 8,215 ft.

C. W. Wick 1 Nelson, Block 25, W. D. C. Hall Sur., A-69. IP 2,792 M.c.f. with 22.26 BC per M.c.f. daily, ¼-in., 59.4°, casing perforations 7,284-86 ft. TD 9,874 ft.

Calhoun County: Hassie Hunt trust estate 1 State, Trace 198, Espiritu Santo Bay. Dry. TD 12,000 ft.

Galveston County: Phillips Petroleum Co. 1 Hulen, Asa Brigham Sur., A-47. IP 407.28 BCPD with 2,500 M.c.f. daily, 12/64-in., casing perforations 14,549-68 ft. TD 15,-010 ft. (New pay in Alta Loma field.)

Jackson County: John B. Coffee and C. G. Dunwoody 1 Guethlin, A. Kountze Sur., A-243. Dry. TD 6,000 ft.

The Texas Co. 1 Williams unit, George Sutherland Sur., A-75. Dry. TD 6,978 ft.

Karnes County: Coates, Palmer & Schimmel 1 Neal, Willis Orton Sur., A-221. Dry. TD 4,200 ft.

Liberty County: B. B. M. Drilling Co. 1 Cherry, Manuel de los Santos Coy 4 Grant, A-16 (Davis Hill area). Dry. TD 1,820 ft.

Matagorda County: Gabriel Oil Co. 1 J. E. LeTulle est., Lot 139, I&GN Sur. 6, Block 1, A-254. Dry. TD 6,730 ft.

Victoria County: M. H. Stone 2 Karnes, IRR Sur., A-222. Dry. TD 4,425 ft.

EAST TEXAS

Cherokee County: T. G. Shaw Trustee 1 Bailey, L. Rhodes Sur., A-724. Dry. TD 4,200 ft.

Harrison County: F. R. Jackson 1 Jackson, Josiah Prewitt Sur., A-546. Dry. TD 6,725 ft.

Hill County: Radford & Medearis 1 Mayse, N. T. Roberts Sur. Dry. TD 660 ft.

Hopkins County: I. E. Ardis and Leon Leggett 1 Long, U. Aiguier Sur., A-2. Dry. TD 4,915 ft.

Hunt County: H. R. Biesel 1 J. L. Ray, A. S. Skaats Sur., A-1015. Dry. TD 4,170 ft. Elev. 557 ft., sub-Clarksville 2,092 ft., Woodbine 2,570 ft.

A. O. Phillips and E. J. Moran 1 Burnett, G. W. Brake Sur., A-63. Dry. TD 3,315 ft.

McLennan County: R. C. Smith and Falcon Oil Corp. 1 McKethan, L. C. Clemmons Sur. Dry. TD 1,603 ft.

Shelby County: R. L. Wheelock 1 Pickering Lumber Co., E. C. Thomas Sur., A-715. Dry. TD 3,515 ft.

Wood County: Tyler Exploration Co. 1 Shirley, G. B. King Sur., A-3. Dry. TD 4,515 ft.

WEST CENTRAL TEXAS

Brown County: Edward A. Dietz 1 Groves, Sec. 9, HT&B Sur. Dry. TD 1,318 ft.

Callahan County: S. C. Herring 1 Duke, Sec. 20, Blk. 8, SPRR Sur. Dry. TD 5,767 ft.

Coleman County: Miller & Banks et al 1 Duty estate, Sec. 25, HT&B Sur. A-402. Dry. TD 1,910 ft.

Comanche County: Varner-Neill Drilling Co. 1 Dunn, Asa Hoxey Sur. Dry. TD 1,814 ft.

Haskell County: Thos. D. Humphrey 1 Hester, W. Dunn Sur., Blk. 160, A-121. Dry. TD 5,085 ft.

Jones County: Miami Operating Co. 1 Franke, G. W. Penny Sur. 271. IPF 364 BOPD, 24/64-in., 42°, top pay 3,626 ft. Canyon sand. TD 5,011 ft. (Oil well.)

Shackelford County: G. E. Kadene & Sons 1-B Green, Sec. 28, BAL Sur. Dry. TD 3,105 ft.

Wilcox Investment Co. 1 Swenson, W. S. Keaghey Sur. Dry. TD 2,005 ft.

Stephens County: Aljon Oil Co. 1 Fambro, Sec. 34, Blk. 6. Dry. TD 1,862 ft.

American Liberty Oil Co. 1 Owens, H. Klasing Sur. IP 144 BOPD, 12/64-in., 42.1°, top Miss. lime pay 4,280 ft. TD 4,325 ft. (Oil well.)

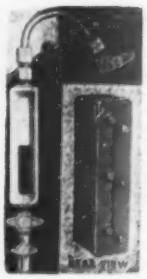
Hayden Farmer Drilling Co. 1 Freeman-Williams, Sec. 32, Blk. 5, T&P Sur. IP 1,300 M.c.f. of gas per day, top pay 2,209 ft. TD 2,220 ft. (Gas well.)

Taylor County: Lester & Duffield, Inc. et al 1-C Bowles, Jr., Sec. 26, BSL Sur. Dry. TD 4,010 ft.

Throckmorton County: Gilchrist Drilling Co. 1 Redwine, Sec. 1634, TE&L Sur. Dry. TD 4,878 ft.

NORTH TEXAS

Archer County: McCollum & Vandivert 1 DeBus, SPRR Sur., A-1202. IPP 20



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WILDCAT COMPLETIONS

BOPD, 39°, sand pay 685 ft. TD 1,850 ft.

Miami Operating Co. 1 Abercrombie, F. M. Tabor Sur., A723. Dry. TD 5,158 ft.

Baylor County: Y-B Drilling Co. 1 Burrell Mills, TE&L Sur. 3137, A-543. Dry. TD 1,467 ft.

Clay County: Reed Pigman 5 Paul Dowdy, Blk. 17, Bacon Subd. Dry. TD 1,277 ft.

J. N. Sachs 1 Harding, MEP&P Sur. 7. Dry. TD 270 ft.

Cooke County: Robert Daniel 2 Gladys Strader, H. Nail Sur., A-790. Dry. TD 1,387 ft.

Jack County: Bridwell Oil Co. 1 Prideaux, Elizabeth Smith Sur., A-524. IPP 17.9 BOPD, 34°, pay 620 ft. TD 3,800 ft.

Warren Petroleum Corp. et al 1 Massie, J. Holderman Sur., A-267. IPP 90 BOPD, 36°, Strawn pay 2,399 ft. TD 2,403 ft.

Montague County: Ernest Hundahl and Frank Wood Associates 1 Brashear, E. Wingate Sur., A-836. Dry. TD 6,301 ft. Elev. 943 ft., Caddo 6,079 ft., Marble Falls 6,279 ft.

The Texas Co. 1 C. F. Phillips, J. Burgess Sur., A-29. IPP 50 BOPD, 40°, conglomerate pay 6,711 ft. TD 7,290 ft.

Wichita County: Jack Dennison 1-B Jennings, Sec. 8, HT&B Sur. Dry. TD 1,850 ft.

Wise County: Warren-Bradshaw Exploration Co. 1 Williams, G. W. Cash Sur., A-166. Dry. TD 5,993 ft. Elev. 961 ft., Caddo 5,503 ft.

Young County: R. W. Darden 1 Bernheart, Blk. 238, TE&L Sur. Dry. TD 1,056 ft.

Lake Creek Oil Co. 1 Herd, TE&L Sur. 225. Dry. TD 996 ft.

Rockett Oil Co. 1 Hinson Bros., Paul Pier Sur. IP 141 BOPD, 20/64-in., 41°, pay sand 2,100 ft. TD 2,230 ft.

WEST TEXAS

Cochran County: McElroy Ranch Co. 1 T. J. Asmus, Sec. 26, Hansford CSL. Dry. TD 8,080 ft. Elev. 3,862 ft., Wolfcamp 7,530 ft., pre-Cambrian 8,074 ft.

Crockett County: David L. Collins 1 Mrs. Alfred Luckett, 7-CD-BBB&C. Dry. TD 1,322 ft.

Continental Oil Co. 1 University 55-8, 8-55-University Lands. Dry. TD 8,667 ft. Elev. 2,535 ft., Ellenburger 7,948 ft., Wilberns dolomite 8,515 ft., Wilberns sand 8,595 ft.

D. D. Thomas 1 Minnie Henderson, 20-K1-GC&SF. Dry. TD 1,090 ft.

Gaines County: Art Wellman and Ted Weiner 1-18 Sherman, 18-G-C&M. Dry. TD 5,385 ft.

Hockley County: Great Western Drilling Co. and Delfern Oil Co. 1 Newton, 105-A135-R. M. Thompson Sur. Dry. TD 7,020 ft.

Stanolind Oil & Gas Co. 1 Bowman, 21-720-SCL. Dry. TD 11,455 ft. Elev. 3,564 ft., Pennsylvanian 9,260 ft., Mississippian 10,755 ft., Ellenburger 11,329 ft.

Midland County: Blount, Christian & Hoffman 1 Lay Powell, 44-36-T1S-T&P. Dry. TD 4,222 ft.

Magnolia Petroleum Co. 1 Roy Parks, 19-40-T3S-T&P. IP 29 BOPD, 37°, Pennsylvanian pay 10,667 ft. TD 11,185 ft.

Albert Plumber 1 Mary King, 40-40-T1N-T&P. Dry. TD 5,507 ft.

Pecos County: W. P. Luse and C. O. Ice 1 Tyrell Trust, 3-115-GC&SF. Dry. TD 3,238 ft.

G. D. Putman & Co. 1-C Hollingsworth, 24-11-H&GN. IP 72 BOPD, 10/64-in., 36°, pay 2,423 ft. TD 2,453 ft.

Schleicher County: M C M Oil Co. 1 R. M. Thomson, 71A-HE&WT. Dry. TD 630 ft.

C. L. Norsworthy Jr. 1 Willoughby, 131-A-HE&WT. Dry. TD 7,700 ft. Elev. 2,385 ft., Strawn 7,143 ft., Ellenburger 7,380 ft.

Texas Crude Oil Co. 1-15 T. C. Meador, Sec. 15, Blk. LL, 6 miles N Eldorado. Dry. TD 7,022 ft. Elev. 2,349 ft., Strawn 6,681 ft., Ellenburger 6,945 ft.

Tom Green County: Standard Oil Co. of Texas 1 Flossie W. Moore, J. Simpson Sur. 838½. Dry. TD 7,072 ft. Elev. 2,099 ft., Strawn 6,698 ft., Ellenburger 7,003 ft.

Upton County: Seaboard Oil Co. 1 Julia Meiners, 19-39-T5S-T&P. Dry. TD 13,200 ft. Elev. 2,809 ft., Strawn 10,632 ft., Devonian 11,896 ft., Ellenburger 13,138 ft.

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WILDCAT COMPLETIONS

NEW MEXICO

Rio Arriba County: Lowry Oil 1 Jicarilla, C NE NW 28-24n-5w. Dry. TD 4,608 ft. Point Lookout 4,433 ft.

Phillips Petroleum Co. Indian 1-B, SE NW NE 21-28n-3w. IP 2,530 MCFG, Mesaverde discovery. (New field.) Point Lookout 6,047 ft. TD 6,264 ft. PB 6,205 ft.

San Juan County: Phillips Petroleum Co. 1-29 Unit 32-4, SW NE SW 29-32n-4w. Dry. TD 6,920 ft. Point Lookout 6,720 ft.

SOUTHEAST NEW MEXICO

Chaves County: Los Nietos Petroleum Co. et al 1-Y White, 30-9s-28e. Dry. TD 8,760 ft. Elev. 3,879 ft., Pennsylvanian 7,175 ft., Mississippian 8,208 ft., Devonian 8,713 ft.

Lea County: Sinclair Oil & Gas Co. 1 State-335, 9-17s-37e. Dry. TD 6,500 ft.

The Texas Co. 1 E. M. Byers, 19-24s-38e. IPP 38 BOPD, 36°, pay 6,626 ft. TD 6,686 ft.

Geo. H. Williams 1 Williams, 6-16s-33e. Dry. TD 5,051 ft.

ILLINOIS

Clay County: Magnolia Petroleum Co. 1 Blair, NE SE SW 13-5n-6e. Dry. TD 2,930 ft.

Coles County: Clyde Bassett 1 Hamilton, NE NW NW 11-13n-7e. Dry. TD 1,862 ft.

Crawford County: H. Adams 1 Schaefer, NW NW SW 1-7n-12w. Dry. TD 1,420 ft.

R. B. Kintop 1-A Jones, SW SE SE 19-6n-11w. Dry. TD 650 ft.

Edwards County: Herndon Drilling Co. 1 Ramsey-Mann, SW NE SE 8-2Sn-10e. Dry. TD 3,407 ft.

Gallatin County: Nash Redwine 1 McCoe, NE NW NE 30-9s-9e. Dry. TD 1,630 ft.

Marion County: A. W. Cherry 1 Glasco, NW SE NW 5-2n-3e. Dry. TD 2,525 ft.

White County: S. G. Walker 2 Harlem, NW SE NW 15-7s-10e. Dry. TD 2,571 ft.

INDIANA

Clay County: C. M. Mansfield 1 Mayer Commission, SE SE SW 1-13n-7w. Dry. TD 1,361 ft.

Daviess County: Maynard Rogers 1 Wilson, NE NE NE 5-3n-6w. Dry. TD 1,240 ft.

Sun Oil Co. 1 Rundolph, SE SE SW 22-3n-6w. Dry. TD 1,360 ft.

Dubois County: O. V. McIntire 1 Loehr, SW NE NE 34-3s-6w. Dry. TD 1,195 ft.

Gibson County: Mahew Oil Co. 1 Littlepage, NE NE NW 14-2s-11w. Dry. TD 2,290 ft.

Perry County: L. Haferty 1 Sigler, NW NW NW 20-3s-2w. Dry. TD 985 ft.

Posey County: Inland Producers 1 McFadden, SE NE NE 5-6s-14w. Dry. TD 2,336 ft.

Spencer County: D. Fortney 1 Wolfman-Marioh, NW SE NW 19-4s-4w. Dry. TD 997 ft.

G. Mollinoix 1 Waggoner, SE SE SE 7-4s-5w. Dry. TD 1,191 ft.

Sullivan County: H. A. Johnson 1 Cooper-Grabar, SW SW SE 36-8n-11w. Dry. TD 799 ft.

Vigo County: T & H Corp. 1-A Hulman & Co., SW SE SW 31-13n-8w. Dry. TD 1,800 ft.

KENTUCKY

Daviess County: F. H. Rhodes 1 Thomas, NE NW SE 17-Q-31. Dry. TD 1,400 ft.

J. R. Fisher 1 Sublett, SE SW SE 15-O-32. Dry. TD 1,309 ft.

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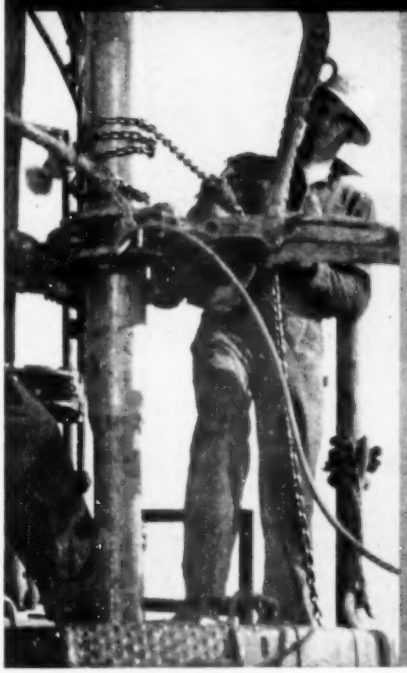

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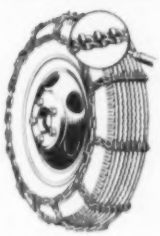

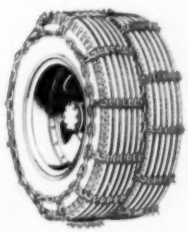

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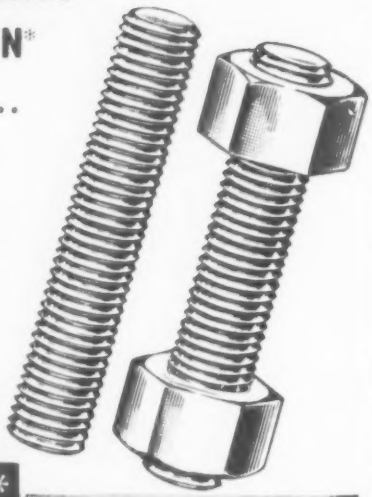

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WILDCAT COMPLETIONS

Hancock County: Ellis & Morrison-Damron 1 Harris, SE SW SW 4-O-34. Dry. TD 601 ft.

Henderson County: Mercury Oil Co. 1 Smith, NE NW NW 1-O-23. Dry. TD 2,632 ft.

Hopkins County: George Taylor 1 Clements, NE SE NE 18-I-25. Dry. TD 545 ft.

Muhlenberg County: W. E. Vick 1 Countzler, NE SE SE 11-I-28. Dry. TD 1,812 ft.

MICHIGAN

Hillsdale County: Grand Valley Drilling Co. 1 Blonde, NE NE NE 21-5s-4w. Dry. TD 1,415 ft. in Traverse lime.

Mason County: The Dow Chemical Co. 1 Appledorn, NW NW NE 2-17n-18w. Dry. TD 4,591 ft. in Niagaran.

Montcalm County: William B. Darke, 2 Webster, W½ NW SW 22-10n-6w. Dry. TD 3,272 ft. in Dundee.

Muskegon County: Taggart Bros. Gas Co. 1 Nelson, NE SW NW 20-12n-17w. Dry. TD 4,509 ft. in Trenton.

Osceola County: Mogul Oil Co. 1 Lloyd, SE SW SE 16-17n-7w. Dry. TD 3,865 ft. in Dundee.

Van Buren County: Norman L. Stevens 1 Henderson, NW NW NE 25-4s-14w. Dry. TD 1,165 ft. in Traverse lime.

Van Buren County: Ford Oil Co. 1 Benjamin, NE NW SW 17-4s-13w. IP 6 BOPD, after acid, pay 1,149-50, 1,152-53 ft. Traverse 1,149 ft. TD 1,153 ft. (Extends Lawton pool.)

Van Buren County: Michigan Oil & Gas Drilling Co. 1 Bainbridge-Kite, SE SE SE 36-4s-13w. Dry. TD 1,166 ft. in Traverse lime.

OHIO

Noble County: Great Lakes Carbon Corp. 1 Herman Pabst, Sec. 15, Elk Twp., IP 220 M.c.f. daily, Ohio shale 2,551-4,810 ft., TD 5,080 ft.

ALABAMA

Escambia County: Gulf Refining Co. 8 Miller, 7-1n-10e. Dry. TD 6,100 ft. (Stratigraphic test).

MISSISSIPPI

Adams County: John S. Callon and Petersen Drilling Co. 1 Scheffel, 46-6n-2w. Dry. TD 7,004 ft. Elev. 292 ft., Wilcox 4,478 ft., base Baker shale 6,326 ft.

Pike County: Sun Oil Co. 1 Walker, 28-4n-9e. Dry. TD 6,252 ft.

Wilkinson County: Jett Drilling Co. 1 Ashley, 9-4n-1e. Dry. TD 7,013 ft. Elev. 136 ft., Wilcox 4,671 ft., base Baker shale 6,455 ft.

SOUTH LOUISIANA

East Baton Rouge Parish: H. L. Rowley, Inc., and C. B. Pennington 1 Pope et al, 83-4s-1w. Dry. TD 10,006 ft.

Jefferson Davis Parish: H. L. Hunt 2 Lock Moore, 35-7s-6w. Dry. TD 9,419 ft.

NORTH LOUISIANA

Concordia Parish: H. L. Hunt and Gulf Refining Co. 25 Fisher Lumber Co. "E," C NE NW 17-6n-8e. Dry. TD 6,500 ft.

Hunt-Gulf Angelina Hardwood Co. "C," C SW NE 18-4n-8e. Dry. TD 7,305 ft.

R. A. Campbell et al 1 Yakey "C," C SE SE 26-4n-8e. Dry. TD 7,205 ft.

Franklin Parish: Chicago Mill & Lumber Co. 2 Mutual "C," 990 ft. N and 467 ft. W of SEc 23-12n-9e. Dry. TD 8,751 ft.

LaSalle Parish: Deep Rock Oil Corp. 1 Nebo Oil Co. "B," 1,980 ft. N and 1,050 ft. W of SEc 41-8n-4e. Dry. TD 4,670 ft.

Hunt-Gulf 91 La. Delta Lumber Co., C SW NW 33-6n-4e. IPF 141 BOPD, Wilcox 4,742-46 ft., 42°, 9/64-in. TD 5,301

ft. (Discovery tentatively called West Elm Ridge.)

Natchitoches Parish: Exploration Drilling Co. 1 La. Long Leaf Lumber Co., C SW SW SE 5-8n-8w. Dry. TD 2,092 ft.

Sabine Parish: T. C. Liddell et al 1 Peoples State Bank, near SEc. SW 30-6n-13w. Dry. TD 230 ft.

ARKANSAS

Columbia County: Ashland Oil & Refining Co. 1 McClurken, C NE SW 6-16s-19w. Dry. TD 6,738 ft.

Lafayette County: Durbin Bond & Co., Inc. 1 Vickers, C SE SW 36-15s-23w. Dry. TD 4,026 ft.

OKLAHOMA

Beaver County: Lynn Drilling Co. 1 Hendricks, C NE NE 17-1n-27eCM. Dry. TD 8,825 ft.

Cimarron County: Fulton 1 Rogers, SE SE NW 27-2n-5eCM. Dry. TD 5,870 ft.

United Producing Co. 1 Spradlin, C SW NE 33-5n-9eCM. IP 22,000 M.c.f. of gas per day, Keyes sand 4,530-53 ft. TD 4,641 ft. (Gas strike.)

Fulton 1 Mathis, NW NW SE 23-6n-8eCM. IP 16,400 M.c.f. of gas per day, Keyes sand 4,668 ft. TD 4,722 ft. (Gas strike.)

Coal County: Tex-N-Mex Development and Jay Simmons 1 Polk, C NE SW 8-2n-8e. Dry. TD 7,485 ft.

Harmon County: Headwaters Oil Co. 1 Cummins, NE NE SW 8-1n-25w. Dry. TD 5,260 ft.

Lincoln County: Alpha Petroleum Corp. et al 1 Hardy, SW SW NW 34-17n-2e. Dry. TD 5,035 ft.

Logan County: Sohio Petroleum Co. and N. I. Smith et al 1 Wright, NW NW NW 20-15n-1w. Dry. TD 6,132 ft.

Pawnee County: Geo. Green Trustee 1 Boulton, NW NW NE 28-21n-4e. Dry. TD 4,189 ft.

Pittsburg County: Intex Oil Co. 1 Wm. Hancock unit, C NW SE 8-6n-17e. Dry. TD 2,307 ft.

Pottawatomie County: Youngblood & Youngblood 1 Norvell, SE NW SE 8-10n-3e. Dry. TD 5,030 ft.

KANSAS

Chase County: Bill Rex 1 Weber, NW NW SW 32-19s-6e. Dry. TD 2,390 ft.

Comanche County: Huber Corp. 1 Lemon-Barbee, SW SW SW 30-34s-19w. Dry. TD 6,590 ft.

Dickinson County: J. H. Wagner 1 Schlesener, SE NW SE 13-15s-3e. Dry. TD 2,428 ft.

Edwards County: Thos. et al 1 Copp, NW SE NW 27-24s-19w. Dry. TD 4,568 ft.

Natural Gas & Oil et al 1 Johnston, NE NW SE 18-25s-16w. Dry. TD 4,760 ft.

Ellis County: El Dorado Refining Co. 1 Braun "D," NE NW SW 34-13s-16w. IPP 240 BOPD, Sooy 3,459-66 ft. TD 3,530 ft. (Opens Braun pool.)

Hodgeman County: I. W. Siegel 1 Smalley, SE SE NE 9-23s-24w. Dry. TD 4,660 ft.

Kingman County: Laura Jane Oil Co. 1 Reno, SE SW SE 33-27s-5w. Dry. TD 3,820 ft.

Meade County: Skelly Oil Co. 1 Ediger, NW NW SE 11-33s-27w. IP 10,004 M.c.f. of gas per day, 5,686-91, 5,715-38 ft. Morrow sand 5,673 ft. TD 6,111 ft. (Gas discovery.)

Pawnee County: Welch & Olsson 1 Ashworth, NW NW SE 8-22s-15w. Dry. TD 3,991 ft.

Pratt County: Hamilton Bros. et al 1 Hamm, SE SE NW 35-27s-12w. Dry. TD 4,506 ft.

Reno County: The Texas Co. 1 McVay, SW SW NW 21-22s-7w. Dry. TD 3,948 ft.

Rooks County: Petroleum, Inc. 1 Cardill, SE SE NW 20-7s-16w. Dry. TD 3,270 ft.

Stafford County: Greenland Drilling Co. et al 1 Cadman, NW NW NE 30-23s-14w. IPP 162 BOPD, Lansing-Kansas City 3,784-96 ft. TD 4,090 ft. (Opens Greenridge pool.)

NEBRASKA

Cheyenne County: U-Tex Oil 1 L. Johnson, SW SW SW 35-15n-48w. Dry. TD 4,601 ft. "J" sand 4,528 ft.

SOUTH DAKOTA

Kingsbury County: Kingsbury Oil Development 1 Dystra, C SW NE 35-11n-57w. Dry. TD 1,095 ft.

NORTH DAKOTA

McKenzie County, Charlson: Amerada Petroleum 1 Cora McKeen, C SE SE 25-153n-95w. Dry. TD 9,191 ft. Madison 8,797 ft.

Mercer County: Williston Oil & Gas 1 Boeckel et al, C SW SW 10-144n-88w. Dry. TD 9,000 ft. Nisku 8,915 ft.

Renville County: Leach & Kelch 1 Paul Gehringer, NE NE NE 21-161n-84w. Dry. 325 ft.

CALIFORNIA

Fresno County: Helm Co. & H. R. Sumpf 84 Indart, 32-17s-15e. Dry. TD 10,506 ft.

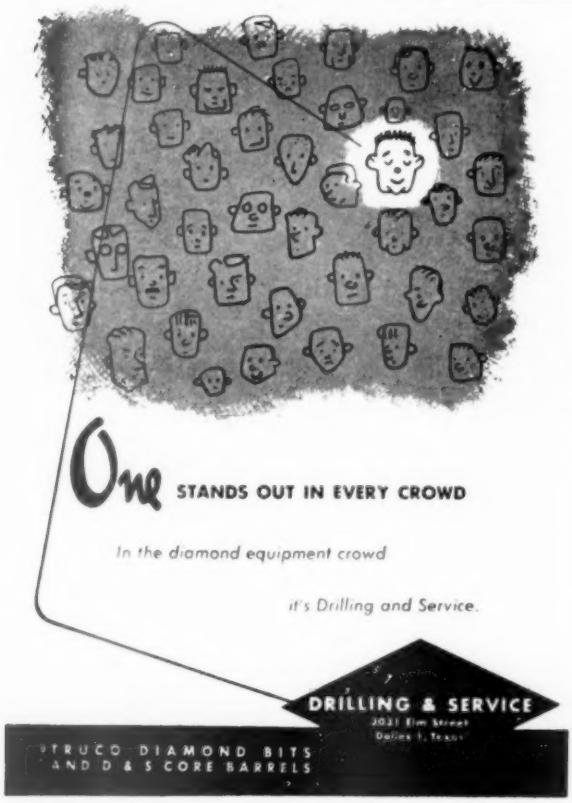
Humboldt County: B-N Development Corp. 1 Rocha, 16-2n-1w. Dry. TD 8,246 ft.

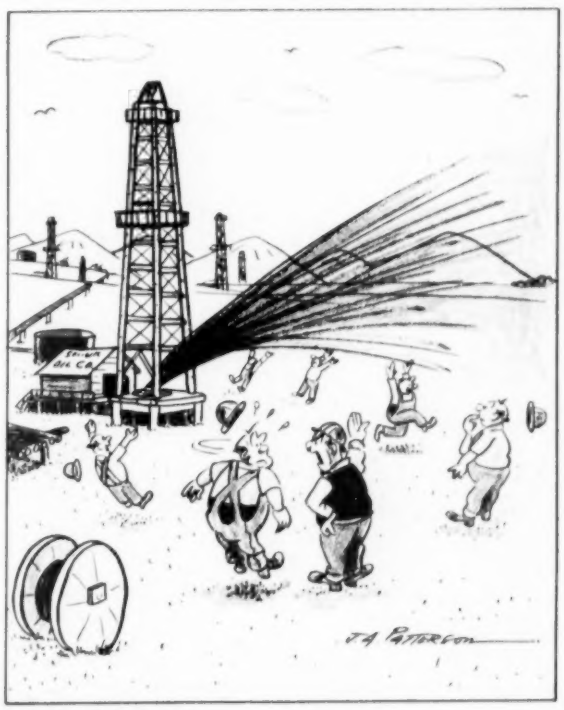
Kern County: Edward Nepple 1 West Woody Community, 9-26s-28e. Dry. TD 1,380 ft.

Kings County: Brookline Oil Co. 2 Travma. Dry. TD 717 ft.

Reserve Oil & Gas Co. 48-20 Orchard, SE SW 20-24s-18e, IPF 310 BOPD rate, 16/64-in. choke, 40° gravity crude, perfs. 4,390-4,408 ft., TD 5,237 ft. (New field discovery in Kreyenhagen-Eocene sand ¾ mile south of Pyramid Hills field).

WILDCAT COMPLETIONS





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WILDCAT COMPLETIONS

Los Angeles County: Rothschild Oil Co. 1 Fouquet, 11-3s-11w. Dry. TD 8,830 ft.
Madera County: H. H. Magee 1-2 Stone, 2-12s-14e. Dry. TD 3,972 ft.
Merced County: Richfield Oil Corp. 1 Henderson, 34-6s-13e. Dry. TD 4,613 ft.
Sacramento County: R. S. Rheem Opr. 1 Kirtlan Comm., 23-7n-4e. Dry. TD 7,482 ft.
Ventura County: Union Oil Co. 92 Torrey, 5-3n-18w, IPF 131 BO in 10 hours, 17 per cent cut, 9.2° gravity, perfs. 12,737-13,730 ft., TD 14,989 ft., PB 13,720 ft. (New deeper pool discovery in Torrey Canyon field.)

MONTANA

Golden Valley County: T. M. Evans 1 Ben Crocker, C SW SW 15-9n-20e. Dry. TD 4,453 ft. Charles 4,430 ft.

WYOMING

Fremont County, Sheep Creek: U-Tex Oil Co. 8 Government, SW SW SE 14-28n-92w. IP pumped 156 bbl. oil per day. Pay zone 2,160-2,217. TD 2,227. PB 2,217 ft.
Hot Springs County, Dickie unit: Stanolind Oil & Gas 1 Unit, NW SW NW 25-45n-101w. IP pumped 290 BOPD, 1-20 per cent water on 4-day test. Tensleep 6,762 ft. TD 6,934 ft. PB 6,740 ft.
Natrona County, Southeast Castle Creek: Wind River Oil Co. 1 Government, NW NE SW 20-37n-80w. Dry. TD 3,549 ft. 3rd Wall Creek 3,533 ft.

UTAH

Uintah County, Section Ridge: Utah Southern Oil 1 Government, SW NW SE 31-5s-24e. Dry. TD 550 ft. Weber 535 ft.

COLORADO

Fremont County: Don Peaker 2 Gindro, NE SW SW 27-19s-70w. Temporarily abandoned. TD 375 ft.
Logan County: F. Kirk Johnson & Balderson & Ute Royalty 1 Kerschner, C SW SE 17-8n-55w. Dry. TD 5,810 ft. Dakota 5,578 ft.
Montrose County: Penrose & Tatum 1 Orme, SW SW NE 18-45n-10w. Dry. TD 1,753 ft. Granite 1,740 ft.
Phillips County: S. D. Johnson 1 State, SE SE SE 16-6n-47w. Dry. TD 3,910 ft. "J" sand 3,772 ft.
Adams County: Carmack & Crawford & Bay Petroleum 1 UPRR, SW SW NW 13-3s-58w. Dry. TD 5,770 ft. "J" sand 5,598 ft.

MANITOBA

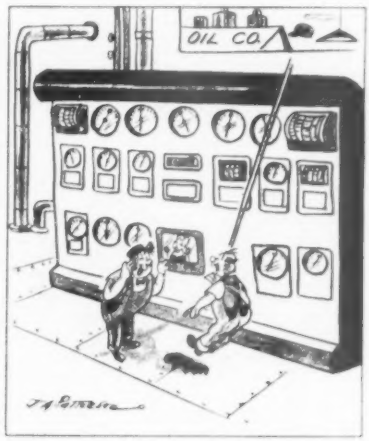
National Bulk Carriers, Inc. 13-10 Province of Manitoba, LSD 13, 10-9-11w1. Dry. TD 2,525 ft.

SASKATCHEWAN

Socony-Woodlet-Southern 15-5 Bigstick, LSD 5, 35-16-24w3. Dry. TD 3,272 ft.
Tide Water-Frontier 15-29 Crown, LSD 15, 29-3-20w3. Dry. TD 4,772 ft.
Shell 11 Wood Mountain, LSD 16, 15-3-6w3. Dry. TD 5,675 ft.
Shell 13 Wood Mountain, LSD 4, 19-8-8w3. Dry. TD 4,651 ft.
Tide Water-Imperial 1 Lampman, LSD 5, 28-6-6w2. Dry. TD 5,638 ft.
Canada Southern 7-19 Smiley, LSD 7, 19-31-25w3. Viking oil well. TD 2,587 ft.
Tide Water-Rautnac 14-29 Crown, LSD 14, 29-16-15w3. Dry. TD 3,540 ft.

ALBERTA

H. B. 1 Green Burns Lake, LSD 7, 30-31-26w4. Dry. TD 8,619 ft.
Overland-Gateway-A.P.I. 1 Athabasca, LSD 1, 30-70-21w4. Dry. TD 2,053 ft.
Texaco 1-D Enchant, LSD 10, 11-13-17w4. Dry. TD 3,385 ft.
Shell-Western Leaseholds A-11-29 Hamilton Lake, LSD 11, 29-33-9w4. Dry. TD 3,580 ft.
Shell-Western Leaseholds B-16-2 Hamilton Lake, LSD 16, 2-34-10w4. Dry. TD 3,770 ft.
Canadian Northern-Pacific 1 South Pouce Coupe, LSD 1, 12-78-13w6. Cadotte sand gas well. TD 6,010 ft.
Amerada F 21-13 Crown "X" W, LSD 14, 13-68-25w5. Permo-Penn. gas well. TD 10,430 ft. PBTD 6,450 ft.



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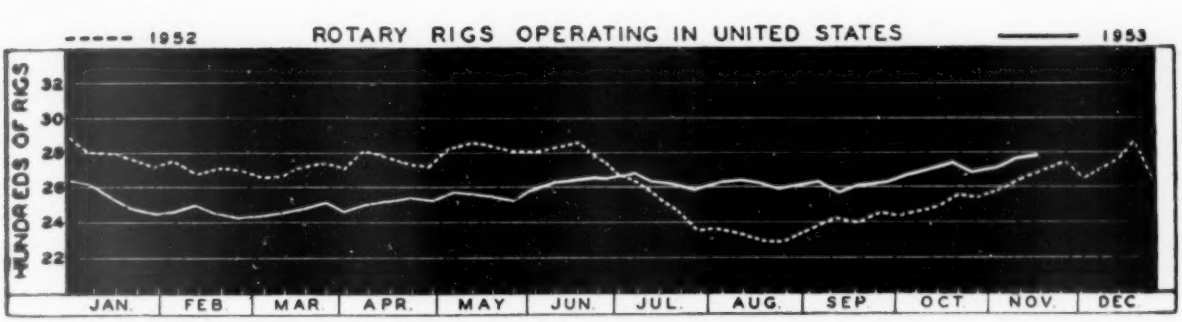
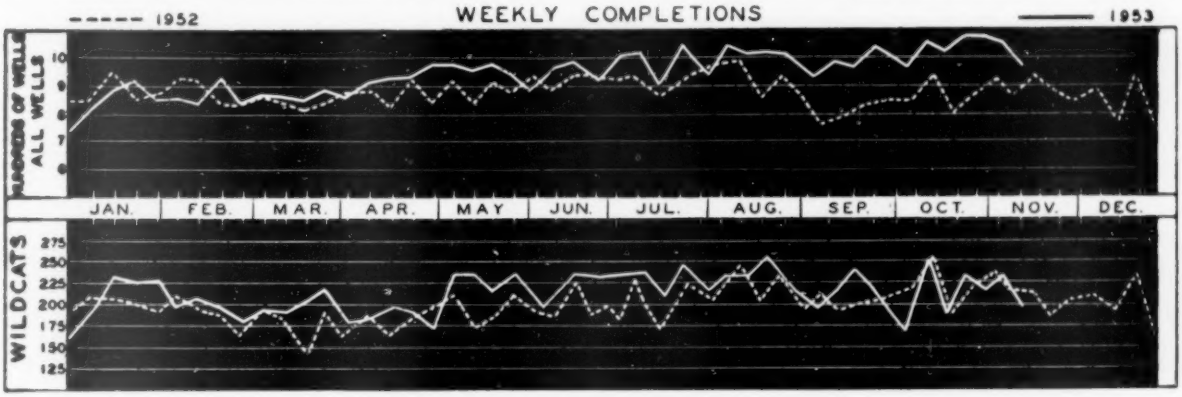




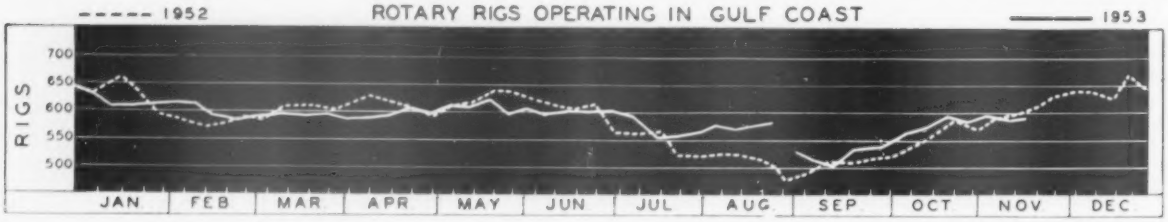
CURRENT STATISTICS

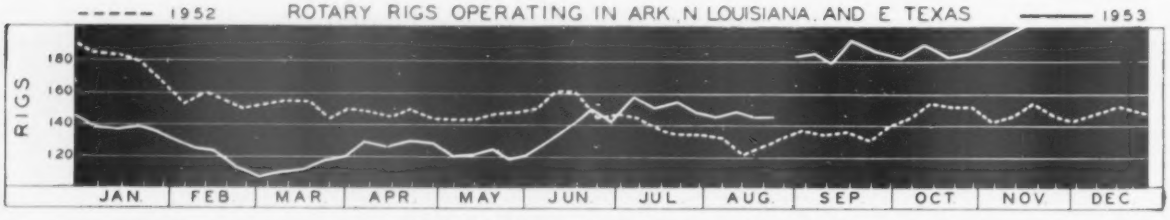
EXPLORATION

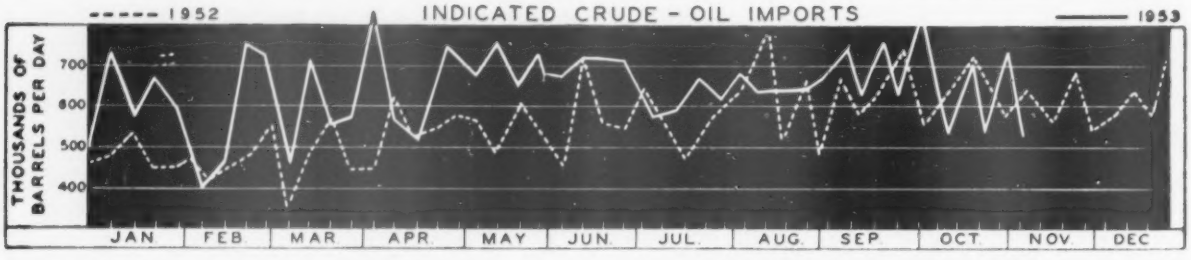
WEEKLY WELL COMPLETIONS . . . WEEK ENDED NOVEMBER 14, 1953

	Total of all wells					Nov. 14		Wildcat completions and discoveries					Cumulative total, 1953				
	Comp.	Oil	Gas	Dry	Footage	1953	1952	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	14	7	0	*7	22,550	665	680	0	0	0	0	0	0	0	0	0	0
Pennsylvania	39	19	5	†15	86,378	1,668	1,673	0	0	0	0	0	0	0	3	12	15
West Virginia	6	1	5	0	19,128	542	520	0	0	0	0	0	0	0	11	7	18
Ohio	26	13	4	9	60,132	927	921	0	0	1	0	1	2	0	4	13	19
Indiana	37	16	0	21	59,155	1,143	1,134	0	0	0	11	11	12	0	2	318	332
Kentucky	32	16	0	16	50,118	1,004	1,152	0	0	0	7	7	8	0	1	171	180
Illinois	69	44	0	25	178,672	1,808	1,869	0	0	0	8	8	5	0	0	364	369
Michigan	17	5	0	12	39,202	544	615	1	0	0	7	8	16	0	5	225	246
Kansas	78	41	3	‡34	272,108	4,208	3,952	2	0	1	11	14	80	0	32	668	780
Nebraska	5	2	1	2	24,647	281	256	0	0	0	1	1	16	0	5	117	138
Oklahoma	134	87	5	§42	474,480	6,512	5,062	0	0	2	9	11	104	6	30	534	674
Texas	301	171	12	118	1,323,387	14,937	15,153	10	3	1	74	88	751	55	153	3,676	4,635
North Central (Dist. 7-B & 9)	103	62	1	40	315,628	5,658	4,937	7	0	1	20	28	393	0	17	1,462	1,872
West (Dist. 7-C & 8)	73	49	0	24	397,773	3,239	4,523	2	0	0	15	17	159	2	13	597	771
Panhandle (Dist. 10)	13	10	3	0	39,358	672	571	0	0	0	0	0	6	2	0	18	20
Eastern (Dist. 5 & 6)	20	3	5	12	101,552	703	702	0	0	0	9	9	20	2	5	232	259
Gulf Coast (Dist. 2 & 3)	42	24	3	15	269,167	2,184	2,290	0	2	0	12	14	90	23	64	592	769
Southwest (Dist. 1 & 4)	50	23	0	27	199,909	2,481	2,130	1	1	0	18	20	89	26	54	775	944
Louisiana	61	30	7	24	337,500	2,419	2,062	1	0	0	9	10	72	31	20	324	447
Northern	41	18	5	18	146,669	1,070	1,116	1	0	0	7	8	11	2	2	138	153
Southern	20	12	2	6	190,831	1,349	946	0	0	0	2	2	61	29	18	186	294
Arkansas	18	13	0	5	74,752	487	359	0	0	0	2	2	12	0	0	114	126
Mississippi	7	1	0	6	45,356	342	308	0	0	0	3	3	17	1	5	148	171
Southeastern States	1	0	0	1	6,100	126	69	0	0	0	1	1	1	0	0	103	104
Montana	4	1	0	3	18,903	380	281	0	0	0	1	1	12	0	0	96	108
Wyoming	30	24	1	5	131,501	712	582	2	0	0	1	3	24	0	3	118	145
Colorado	10	2	0	8	49,157	612	398	0	0	0	5	5	25	0	11	268	304
Utah	2	1	0	1	6,187	62	71	0	0	0	1	1	3	0	4	32	39
New Mexico	24	10	8	6	141,683	1,235	903	1	0	1	5	7	22	1	15	114	152
California	45	35	1	9	214,411	2,243	2,124	3	0	0	8	11	62	0	11	493	566
North Dakota	6	2	0	4	35,970	233	95	0	0	0	4	4	9	0	0	64	73
Miscellaneous (S. D.)	1	0	0	1	1,095	71	123	0	0	0	1	1	1	0	4	43	48
Total United States	967	541	52	374	3,672,572	43,161	40,362	20	3	6	169	198	1,254	94	319	8,022	9,689
Total previous week	1,051	531	82	438	4,184,792			27	1	6	199	233	1,234	91	313	7,853	9,491
Total November 15, 1952	922	443	79	400	3,733,695			26	2	7	181	216	1,217	72	223	7,623	9,135

Service wells included: *7, †12, ‡3, §2.



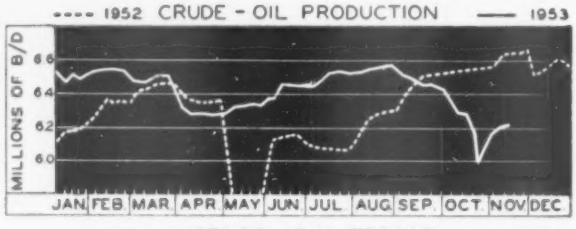


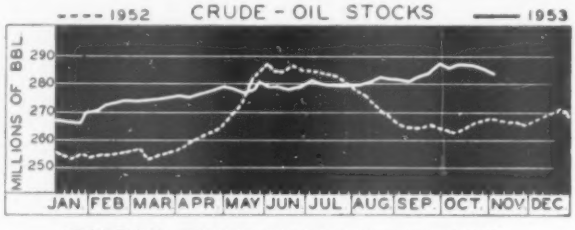


DAILY AVERAGE PRODUCTION FOR WEEK

	November 14			Nov. 7
	Crude oil	Lease condensate	Total	total
Alabama	4,700		4,700	4,600
Arkansas	75,450	450	75,900	74,500
California	999,400		999,400	1,000,200
Colorado	105,400		105,400	105,100
Eastern	59,500		59,500	59,000
Florida	1,500		1,500	1,500
Illinois	168,700		168,700	166,100
Indiana	36,300		36,300	34,600
Kansas	289,550		289,550	298,000
Kentucky	32,500		32,500	32,600
Louisiana	642,600	38,200	680,800	679,050
North	102,100	3,200	105,300	103,550
South	540,500	35,000	575,500	575,500
Michigan	32,100		32,100	32,300
Mississippi	88,550	3,400	91,950	90,300
Montana	32,700		32,700	32,700
Nebraska	12,800		12,800	12,200
New Mexico	205,000	750	205,750	205,750
Oklahoma	517,600		517,600	514,200
Texas	2,572,700	47,225	2,619,925	2,637,425
Dist. 1	38,300	400	38,700	38,700
Dist. 2	137,075	6,000	143,075	143,075
Dist. 3	418,200	23,800	442,000	442,000
Dist. 4	241,350	5,900	247,250	247,250
Dist. 5	45,200	450	45,650	45,650
Dist. 6	115,250	5,100	120,350	120,350
East Texas field	239,000		239,000	239,000
Dist. 7-B	118,000	50	118,050	118,050
Dist. 7-C	155,525	4,125	159,650	159,650
Dist. 8	803,875	1,000	804,875	822,375
Dist. 9	184,425	350	184,775	184,775
Dist. 10	76,500	50	76,550	76,550
Utah	4,600		4,600	4,500
Wyoming	234,200		234,200	209,700
North Dakota	14,200		14,200	14,200
Total U. S.	6,130,050	90,025	6,220,075	6,208,525
Change from previous week, up			11,550	
Canada	261,875		261,875	209,000
Total U. S. production January 1-November 14			2,060,205,825 bbl.	
Same period last year (crude plus cond.)			*1,982,563,200 bbl.	

*Includes 26,836,285 bbl. condensate.



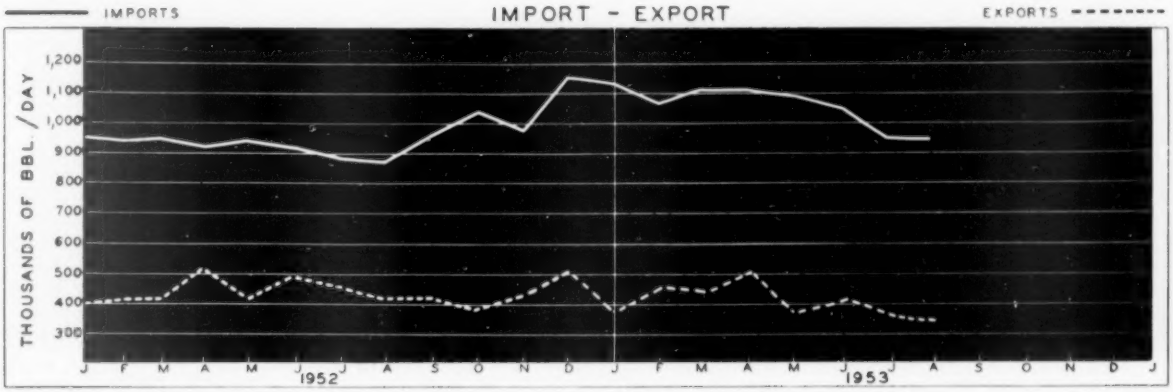


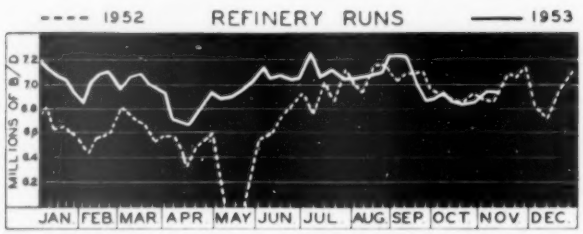
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

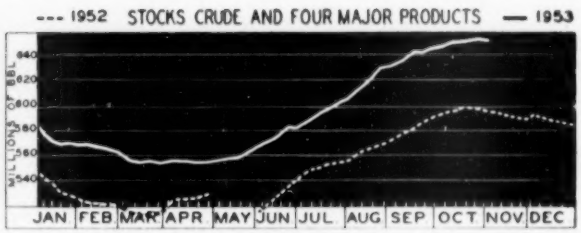
(Thousands of barrels)

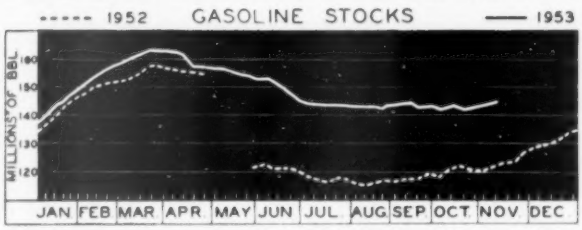
	Nov. 7, '53	Oct. 31, '53	Nov. 8, '52
Pennsylvania Grade	2,826	2,911	2,233
Other Appalachian	1,739	1,853	1,956
Illinois, Indiana, Michigan	13,067	13,029	12,232
Arkansas	3,119	3,420	2,990
Louisiana	16,668	17,060	15,640
North	2,937	3,199	2,402
Gulf	13,731	13,861	13,238
Mississippi	3,586	3,604	3,391
New Mexico	8,972	8,997	7,319
Oklahoma and Kansas	39,636	39,750	38,431
Texas	134,093	134,734	129,830
East Texas	12,026	12,350	11,890
West Texas	59,846	60,180	58,793
Texas Gulf	28,905	29,436	26,159
Other Texas	33,316	32,768	32,988
Rocky Mountain	16,816	16,996	14,958
California	32,788	32,654	31,017
Foreign	†10,505	11,393	7,702
Total	283,815	286,401	267,699

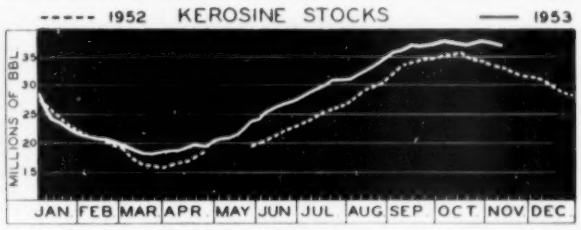
*Bureau of Mines. †Includes 3,484,000 bbl. in California.

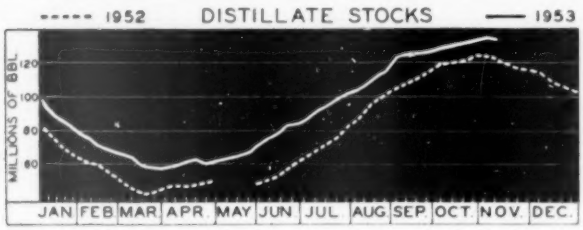


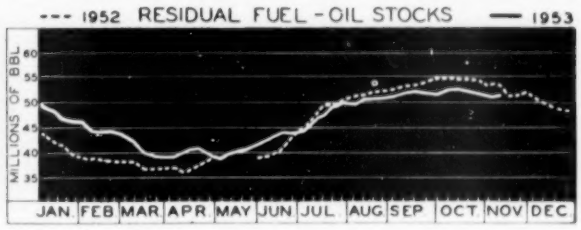












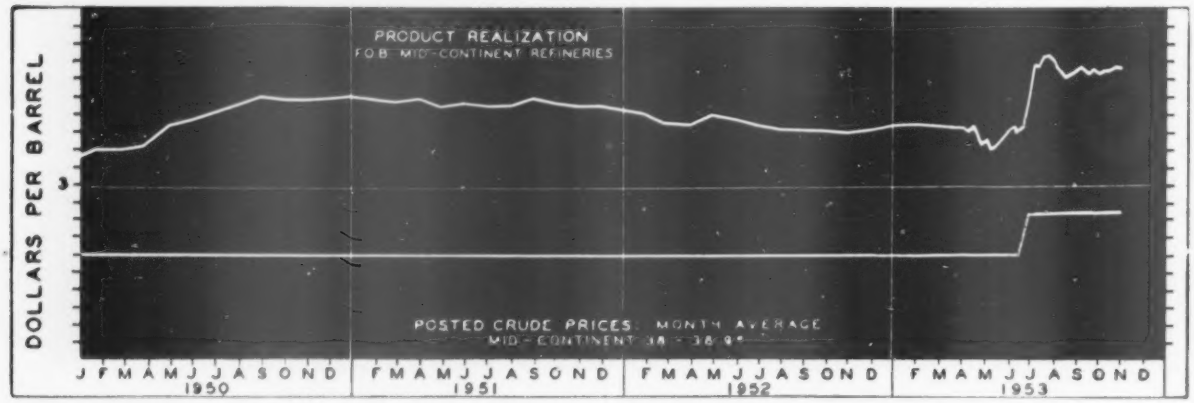
(Report Delayed Because of Armistice Day Holiday. Table for November 14 on Page 175)

A.P.I. REFINERY REPORT, NOVEMBER 7

(Thousands of barrels)

District	Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.	Stocks† Gaso.‡	Kero.	Dist.	Resid.	Bureau of Mines, November 1952 — Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid
East Coast	1,049	411.6	39.3	260.8	212.1	33,128	15,821	50,421	11,989	1,076	426.9	37.3	273.6	249.1
Appalachian:														
District 1	100	39.6	5.7	17.7	13.6	3,774	652	1,654	834	107	45.7	7.2	17.9	14.1
District 2	92	40.1	7.9	11.4	10.9	1,722	686	731	122	89	42.6	8.1	13.5	14.9
Ind., Ill., Ky.	1,312	702.0	90.3	227.9	189.6	27,770	9,602	24,635	4,627	1,307	710.0	85.7	133.0	187.0
Okla., Kans., Mo.	527	304.1	10.9	121.7	42.4	14,346	2,191	12,740	1,305	586	335.7	10.0	146.7	62.2
Inland Texas	245	178.3	11.7	39.3	31.9	5,794	662	2,677	1,444	252	177.8	12.0	39.3	36.7
Texas Gulf Coast	1,718	814.6	109.8	384.0	234.4	20,731	4,206	17,398	7,478	1,765	823.9	145.4	437.6	264.0
La. Gulf Coast	530	261.3	24.1	158.6	44.4	8,109	2,447	7,409	1,318	528	261.5	66.1	124.0	54.3
N. La. and Ark.	87	39.9	7.6	16.1	6.4	3,324	605	914	166	75	31.1	7.7	19.5	6.9
Rocky Mountain:														
New Mexico	20	13.0		2.9	3.7	175		67	28	20	12.8	0.8	2.5	4.2
Other Rocky Mtn.	196	102.4	3.9	43.9	35.3	4,561	258	2,664	960	234	118.1	7.3	43.4	47.0
California	1,086	457.7	19.4	154.4	354.2	20,298	448	14,563	21,065	1,010	429.5	5.5	159.3	359.0
Nov. 7, 1953	6,962	3,364.6	330.6	1,438.7	1,178.9	143,732	37,578	135,873	51,336	7,049	3,415.5	393.1	1,510.3	1,299.4
Oct. 31, 1953	6,867	3,387.6	388.7	1,453.3	1,141.6	143,368	37,963	134,631	51,558					
Nov. 8, 1952	6,860	3,352.1	387.6	1,482.3	1,211.1	121,374	33,383	120,146	53,602					

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit, and in pipe lines.


PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
DOLLARS PER BARREL
3
POSTED CRUDE PRICES: MONTH AVERAGE
MID-CONTINENT 38 - 38.9°
J F M A M J J A S O N D
1950
F M A M J J A S O N D
1951
F M A M J J A S O N D
1952
F M A M J J A S O N D
1953

In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate and fuel oil. Realization averaged $3.67 for week ended November 7, $3.69 for previous week, and $3.36 for November 1952. The above trend information is based on volumes and current prices and therefore does not reflect changes in operating costs.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of November 18, 1953. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline	11.125-11.625	12.75-13.8	11-11.75
Premium gasoline	12.125-12.625	14.25-14.8	12-12.75
42-44 w.w. kerosine	8.875-9.25	10.4-10.9	9-9.5
No. 2 straw fuel oil	7.875-8.25	9.4-9.9	8.25-8.5
No. 6 residual	$1.35-1.45	$2.25-2.40	$1.85-1.90

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	5.5	5.0	5.25
Grade 18-55	6.6	6.10	6.35

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	13.75
750 vis., No. 3-4 neutral	16.75
2,000 No. 5-6 neutral	18-18.75

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	20.5-21.5
200 vis., No. 3 neutral, 0-10 pp.	14.5

Western Pennsylvania

145-155 vis., 10 p.t. bright stock	21.5
180 vis., 10 p.t. neutral	25.5

WAX

Mid-Continent

132-134 A.M.P.	6.0

PRODUCT markets are following the same general trend that has existed for several months. Gasoline continues to be very soft in all major marketing areas. Distillate is moving much slower than was expected for this period of the heating season. Residual fuel is steady to strong on all markets east of California.

The reduction in tank-wagon prices of regular-grade gasoline that was initiated by Socony-Vacuum Oil Co., Inc., in the northeastern states has spread down the eastern seaboard and followed the Gulf Coast as far as Louisiana. In general the reduction has amounted to about 0.3 cent a gallon for regular.

Some companies have used the period of change to adjust the differential between prices of regular and premium. With the announcement of new additives and higher octane numbers for premium-grade gasoline, there has been a trend toward a spread of about 2.5 cents a gallon between regular and premium. Distributors as well as refiners report larger increases in demand for premium grades than for regular. Increases in production of higher-quality gasoline have cut deeper into the supply of high-quality blending stocks at the refinery. In many cases this shift called for more new processing equipment and higher processing costs.

Distillate-fuel markets are feeling the influence of the warmer-than-normal season. Distillate stocks have continued to gain until the middle of November in some of the past years, but in most cases inventories had not increased at above-normal rates during the summer months.

The storm on the East Coast and the approach of the closing date for the barge canal have tended to increase distillate and kerosine sales in New York Harbor but not enough to dry up all the material available at 9.4 cents for barge deliveries of No. 2.

Residual is more readily available on the East Coast, but the market still can be classified as steady.

CRUDE PRICES
GRAVITY SCHEDULE

	Signal Hill, Calif.*	Okla-homa, Kansas	Gulf Coast Tex.†	West Tex.‡
14-14.9	$1.87	....	....	
15-15.9	1.93	....	....	
16-16.9	1.99	....	....	....
17-17.9	2.05	....	....	....
18-18.9	2.11	....	....	....
19-19.9	2.18	....	....	....
20-20.9	2.24	$2.50	....	$2.37
21-21.9	2.30	2.52	....	2.39
22-22.9	2.37	2.54	....	2.41
23-23.9	2.45	2.56	....	2.43
24-24.9	2.53	2.58	$2.91	2.45
25-25.9	2.61	2.60	2.93	2.47
26-26.9	2.69	2.62	2.95	2.49
27-27.9	2.76	2.64	2.97	2.51
28-28.9	2.83	2.66	2.99	2.53
29-29.9	2.91	2.68	3.01	2.55
30-30.9	2.97	2.70	3.03	2.57
31-31.9	3.04	2.72	3.05	2.59
32-32.9	3.12	2.74	3.07	2.61
33-33.9		2.76	3.09	2.63
34-34.9		2.78	3.11	2.65
35-35.9		2.80	3.13	2.67
36-36.9		2.82	3.15	2.69
37-37.9		2.84	3.17	2.71
38-38.9		2.86	3.19	2.73
39-39.9		2.88	3.21	2.75
40 and above		2.90	3.23	2.77

*Standard Oil Co. of California. †Upper Texas Gulf Coast. ‡Includes New Mexico Permian.

Prices East of California effective June 15, 1953. California prices effective February 16, 1953. Pennsylvania Grade prices effective September 21, 1953.

FLAT CRUDE PRICES

Representative posted schedules per barrel.

Louisiana:	
Cotton Valley (distillate)	$3.00
Cotton Valley (Holloway crude)	2.95
Texas:	
East Texas	2.90
Chapel Hill	2.83
Conroe	3.13
Van	2.73
Pennsylvania Grade:	
Bradford	4.05
Southwest Pennsylvania	3.61
West Virginia	3.55
Ohio	3.54
Illinois Basin	3.02

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FOR SALE: U-15 rotary rig like new, including trailer house fully equipped. Wondeful buy. Available only because of health. Now drilling in West Texas. Inspect while in operation to get better idea. H. W. Sullivan, 611 Gulf States Bldg., Dallas 1, Tex.

FOR SALE: At our Stone gasoline plant near Burrton, Kansas, one used Model 6 WDH-5 BS&B gas dehydrator, Glycol type. New in '49. Cities Service Oil. Patridge, Bartlesville.

FOR SALE: 10,000'—4½" drill pipe, with tool joints cut off, located at Hobbs, New Mexico. Makin Drilling Company, Box 1628, Hobbs, New Mexico.

ONE WORTHINGTON 315 Skid Mounted Compressor complete for pumping natural gas. This is a two stage Compressor from 0 to 125# pressure, capacity 315 cu. ft. per minute. Used very little. For price inquire A. V. Hoenig, 1705 Philtower Building, Tulsa, Oklahoma.

Gasoline Duplex 4½" x 6" Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units. Westinghouse 20-25-50 KW Generating Units.

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AT-3427—Houston, Texas

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All sizes for pipe line and fuel gas requirements.

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FOR SALE: Failing Model 1500 drilling equipment. Have available for sale several drills exceptionally complete and in excellent condition. Particularly suitable for water well or deep core work. This equipment relatively new and now operating. Substantial savings possible. Box G-738, The Oil and Gas Journal, Tulsa, Oklahoma.

NOW WORKING—Portable workover rig on tandem trailer, complete. Cardwell K hoist powered by Waukesha GAK. 5 x 10 Gardner-Denver mud pump, Brewster block, Brewster OB-12 oilbath rotary, Cameron preventer, light plants, winch, trucks, pick-up truck, house trailer. Inventory on request. $17,500.00. Box G-768, The Oil and Gas Journal, Tulsa, Oklahoma.

EVERYTHING in new and used equipment for well drilling. Fishing tools rented. Save money, get quotations from Pressey & Son, Pueblo, Colorado.

REDA PUMP complete w/#4—20 Motor, 45½ H.P., 650 Volt, 41.6 Amps. #90—Pump Housing, #5595—Switchboard w/recording Ammeter 3400'—#4 Cable 125 Amp. Auto Transformer Accessories. Engine 225 H.P. Climax Type R-225 on Skid. Alternator G. E. 125—KVA, 100 KW, 440 V. A. C. w/Transformer, Flexible coupling and skid base. House—10' x 18' wood frame, w/G.I. Roof and Siding on Skid. Engine—165 Hp. Climax R-61 on Skid. Herndon Drilling Co., 421 Mayo Bldg., Tulsa, Phone 4-9700.

USED EXCELLENT CONDITION IN OPERATION

One Each (4¾" to 1") (8⅝" to 2¾") (13⅜" to 4½") LANDIS Leadscrew Receding Head Pipe Threading and Cutting Machine Motor Driven.

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P. O. Box 2589 **Houston**

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N-80 TUBING
11,000 ft. of new 2⅛ inch upset N-80 Jones & Laughlin Integral-joint. Pete Thomas. Phone 4-6455 or 6-8075, 1408 Philtower Tulsa, Oklahoma.

FOR SALE: 30,000' of 3½" O.D. 9.20# 10-Rnd. Thd. Range 2 #1 Used Seamless Oil Well Tubing, just pulled from gas wells. 75% of this material still has the stencils visible. We will load on cars F.O.B. Canton, Ohio, at .78c per foot. SERVICE PIPE & SUPPLY CO., INC., 2800 West Tusc., Canton, Ohio. Phone No. 2-1332.

SALES and rentals of cable drilling and fishing tools, casing and equipment, from the Southwest's largest stock of used cable tools and oil field supplies. Degen Pipe and Supply Co., Tulsa, Oklahoma.

FOR SALE: 5—Shriver 42"x42" cast iron Filter Presses, Plate & Frame Type, 27, and 54 chambers 1" cake; 15—Sperry 18"x18" cast iron Filter Presses, 11 chambers; #12 Sweetland Filter for 72 monel covered leaves on 2" centers. Immediate shipment. Attractively priced. Consolidated Products Co., Inc., 17-20 Park Row, New York 38, N. Y. BArclay 7-0600.

FOR SALE
USED TUBING & CASING

60,000' 2⅜" OD EUE 4.70# R-2 10V Thread Seamless Tubing. 6000'—7" OD 22 and 24# 10V Thread R-2 Seamless Casing. All of the above Cold Water Tested to 3000#.

SABINE PIPE & SUPPLY CO.
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25,000—6⅝" OD. Seamless, 18.97#, Range 2, beveled, clean inside and out.
50,000—3½" OD, T&C, Electric weld and Seamless, NEW, 6.50#
40,000—4½" OD, T&C, Electric weld and Seamless, NEW, 8.50#
Will rent, trade or sell. Bargain.

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Ph. 3-6141 **Box 1858, Tulsa**

FOR SALE

Complete Rotary Drilling Rig—Emsco 350 Draw Works with three Wakdu Waukesha drive——New Oil Well 7¼ x 14 Pump——120 ft. Lee C. Moore mast. Now operating near Chinook, Montana. Rock Bottom Price.

Chas. Beu

NORTHERN PUMP CO.
Chinook, Montana

EQUIPMENT FOR SALE

FOR SALE: 90 H.P. Twin Superior Compressor, Skid Mounted, Young Radiator & Intercooler. 11" x 5½" x 16". Extra 5½" Cylinder. Alfred B. Kern Company, 223 Wright Bldg., Tulsa, Oklahoma.

FAILING model heavy duty 1500 drill and water truck. Write to Box 819, Longmont, Colorado, for details.

FOR SALE: Approximately 3600 ft. of 4½" 16.60# drill pipe with Hughes Flash-weld extrahole tool joints. Model BC-6, 200 ton Emsco Swivel. Melton Supply Company, Box 1360, Seminole, Oklahoma.

FOUR Kewanee Oilfield Boilers, 125 H.P. 300 lbs. W.P. Drilling Equipment Mfg. Co., Box 4728, Oklahoma City, Okla.

FOR SALE: In the Seminole field, one 80,000 bbl. erected steel welded Chicago Bridge storage tank. Cities Service Pipe Line, Patridge, Bartlesville, Oklahoma.

PONTOON BARGES

We own and offer for immediate sale approximately 900 surplus Army pontoon sections. These sections can be fastened together to form floats, barges, or bridges of many different sizes or shapes, or can be used for numerous other purposes. They are formed of steel plate and filled with air foam to render them virtually unsinkable. Each section weighs approximately one ton.

We offer these at $40.00 per section, f.o.b. Columbus, Ohio. Original cost many times this price. Write, wire, or phone

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48,000 FEET 5½" OD x 15½, LT&C, J-55, API, Range 2, Seamless Casing at

$1.55 per ft.

Houston, Tex.

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NOTICE: We buy. We sell equipment everywhere. If you want to sell or buy contact Pressey & Son, Pueblo, Colorado.

WILL PAY highest prices for used casing, used line pipe, abandoned leases, or other surplus lease equipment. Your idle producing equipment is worth dollars. Greer Pipe & Supply Co., Box 1383, Tulsa, Oklahoma.

HELP WANTED

FOREIGN EMPLOYMENT. List of oil companies and drilling contractors showing where to apply for foreign jobs. OIML Co., Box 2603, Tulsa, Okla. $5.00 cash.

RAPIDLY EXPANDING major oil pipe line has an opening for a graduate accountant for tax and special accounting work. Location is North Central United States. Please include full resume of education, experience, age and salary expected. Address reply to Box G-796, The Oil and Gas Journal, Tulsa, Oklahoma.

MECHANICAL ENGINEER

Age 35-45. Full responsibility design and new construction. Gulf Coast refinery. Substantial refinery experience essential. Send replies in confidence to Box G-788, The Oil and Gas Journal, Tulsa, Oklahoma.

HELP WANTED

SOUTH AMERICA. These jobs are with one of the better oil companies. Our fee paid. Mechanical Engineer—graduate, experienced or inexperienced. Petroleum Engineer—graduate, experienced or inexperienced. Chemical Engineer—graduate, experienced or inexperienced. Geologist—graduate, experienced or inexperienced. Mud Technician—two or more years experience, single. Tool Pusher, under 40, 3 years experience. Accountant—college graduate, Accounting major, single. All information confidential and should be mailed to CHAS. J. LOVELESS PERSONNEL SERVICE, 616 South Main St., Tulsa, Oklahoma. Phone 3-5168.

SEISMIC SUPERVISOR required by expanding and aggressive seismic contracting company. Should have ability to supervise any domestic area and have good professional contacts. Minimum requirements, college degree in geophysics or related fields and eight years' seismic experience. Good future. Tulsa location. Box G-705, The Oil and Gas Journal, Tulsa, Oklahoma.

RAPIDLY EXPANDING major oil pipe line has an opening for a graduate engineer for general pipe line engineering work. Location is North Central United States. Please include full resume of education, experience, age and salary expected. Address reply to Box G-795, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEER CHEMICAL

(CHEMICAL OF PETROLEUM DEGREE)

Petroleum company in New York metropolitan area seeks staff advisory engineer; 5 years' experience in refinery or research lab. To age 35. Give resume. Box OJG 118, 221 W. 41 St., New York City.

TECHNOLOGIST
CHEMICAL ENGINEER

30-35 to specialize in study of new methods and processes. Gulf Coast location. Comparable experience preferred. Send replies in confidence to Box G-787, The Oil and Gas Journal, Tulsa, Oklahoma.

OFFICE MANAGER

Man with experience in refinery payroll, credit, traffic, and general accounting to head office personnel of new refining company located in Chicago area. Give complete details of experience, availability and salary desired in first letter.

Box G-792
THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

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1. PETROLEUM CHEMIST

With degree in Chemistry + 5 years' experience in Petroleum Engineering Lab. BASE SALARY UP TO $600, depending on experience and qualifications.

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With degree in Petroleum Engineering + 3 years' fields experience. BASE SALARY UP TO $500, depending on experience and qualifications.

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WE MAKE LISTS showing where to apply for oil industry jobs. Write us. Oil Industry Mailing List Co., 405 Tuloma Bldg., Tulsa, Okla.

WANTED FOR EMPLOYMENT: Petroleum Engineer or Geologist with two or three years' experience in Louisina Gulf Coast. Duties will entail preparation and maintenance of detailed structure and isopach maps of south Louisina fields and evaluations necessary in field studies. Work located in New Orleans with reliable and financially strong concern. Reply giving age, experience in detail and salary desired. Inquiries will be kept strictly confidential. Our employes know of this ad. Box G-713, The Oil and Gas Journal, Tulsa, Oklahoma.

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For New York office of major foreign producer. Proficient in mathematics with 4 or more years' extensive experience in oil and gas reservoir engineering on primary and secondary recovery problems. Duties will include preparations of basic field production and reservoir data for application in analogue and digital computors, performance of analytical analysis of field behavior and interpretation and preparation of resulting data for reservoir engineering reports on specific fields.

Write giving full particulars regarding personal history and work experience. Please include telephone number.

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PRODUCTION MANAGER
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CHIEF PETROLEUM ENGINEER
EQUIPMENT ENGINEER
ROTARY RIG MECHANIC
ROTARY TOOL PUSHER
WELL SITE GEOLOGIST
GEOLOGICAL SECRETARY

For work on DeMares Concession, Colombia, South America. Excellent salary plus substantial income tax savings. Good living conditions. Two year contract. Annual local vacation. Also paid vacation to United States when contract completed. Give details of age, education, marital status and experience by letter. All replies held confidential. Reply to.

Box G-789
The Oil and Gas Journal
Tulsa, Oklahoma

HELP WANTED

EXPERIENCED COMPUTER wanted by established contract company. Degree in geology or related sciences helpful, but not essential. Salary commensurate with experience and ability. All replies held in strictest confidence. Include details of experience and education. Box G-769, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED SEISMOLOGISTS, Party Chiefs, Seismic Computers, and Observers by major oil company. Seismologists will be permanently located in Mid-Continent Area. Applicants should have geological and/or geophysical background or at least five years' practical experience. Give full details of education and experience in letter. Reply to Box G-760, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

ATTENTION: Well established oil well drilling contractor desires to manage and supervise; Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No 1628, Ph. No. 3-3141, Hobbs, New Mexico.

CHEMICAL ENGINEER: Broad refinery operating and pilot plant experience. Process engineering on refineries, petrochemical plants. Desire to relocate south-southwest. Box G-782, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM GEOLOGIST, 31, married, 5 years' varied experience in Rocky Mtns., with consultant and major company, desires position with independent company or consultant. Box G-783, The Oil and Gas Journal, Tulsa, Okla.

AIR LINE EXECUTIVE PILOT, twenty thousand hours, sixteen years air line captain, six years corporation executive pilot, excellent record, references, desires flying position. George R. Farnham, Route 2, Longview, Texas. Phone 5151.

DRLG. SUPT.: Nine years' experience, all phases drilling and well completion, Gulf Coast, offshore, Mid-Cont., Okla., Kans., Colo., Neb. & Wyo. Plus one year in South America. Dual and triple zone well completion and reservoir engineering. Have been in oil work since 1934. Graduate Petroleum Engineer. Box G-731, The Oil and Gas Journal, Tulsa, Oklahoma.

PRODUCTION FOREMAN interested in foreign work. Speaks Arabic and some Spanish. Can furnish references. Box G-793, The Oil and Gas Journal, Tulsa, Oklahoma.

RELOCATE: GEOLOGIST, 26, 3 years concentrated fieldwork (Rotary Completions) and some subsurface experience in Mid-Continent area, desires position in Rocky Mountain area. Box G-794, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED GRADUATE ENGINEER with electrical and instrumentation background for engineering department of Southwest Refinery. Box G-785, The Oil and Gas Journal, Tulsa, Oklahoma.

ELECTRICAL ENGINEER: 31-year old effective organizer and planner of both technical and administrative operations has done considerable design and development work in electronics, radioactivity, well logging. Ability to visualize over-all picture; can take added responsibilities quickly in general management areas; married. Box G-790, The Oil and Gas Journal, Tulsa, Oklahoma.

CHEMICAL ENGINEER, age 40, twenty years' experience in the operation and design of Gasoline Plants, Refineries and Petro-Chemical Plants, specialized in the design and operation of high purity ethylene plants. Desires responsible position with a progressive Oil Company. Box G-791, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE MAPS

DRY HOLE MAP OF OREGON, 42" x 72" DRY HOLE MAP OF WASHINGTON, 42" x 84". Price, $10.00 per map. Northwest Scouting Service, Public Service Building, Portland, Oregon.

LEASE AND DRILLING BLOCKS

600 ACRE Lease Eastern Kentucky. One well Berea Sand excellent prospect for fracturing. Will assign one-half interest for capital to further develop. Box G-781, The Oil and Gas Journal, Tulsa, Oklahoma.

LISTS FOR SALE of leases and promotion of oil deals. Oil Industry Mailing List Co., 405 Tuloma Bldg., Tulsa, Okla.

WILL pay cash instantly for leases (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2153, Denver, Colorado

SEE A. L. Bowles, Rollow Building, Ada Oklahoma, for drilling deals.

FOR SALE: Eighty (80) acres with 4 good producing wells less than 600 feet deep. Space for more wells. Gravity 40. Price $20,000. Act quick. W. Kyle, 1006 Dallas Avenue, Houston, Texas.

LOOKING FOR A LEASE? There will be over 40,000 wells drilled this year. If you are looking for a lease, drilling block, or drilling deal and haven't found it in this column, or if you have a lease or drilling block you want drilled, a Journal classified advertisement can find an interested party. See box heading for classified rates, or write The Oil and Gas Journal.

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wishes to purchase producing oil properties making between 30 and 150 bbls. of oil per day. Prompt investigation of all bona-fide offers. Prefer Kansas, Oklahoma or Texas but will consider all attractive offers.

Write Box G-797

The Oil and Gas Journal,
Tulsa, Oklahoma

PRODUCTION WANTED

PRODUCTION WANTED

Will pay cash for management block or controlling stock of producing company with upwards of 500 barrels daily oil, or equivalent gas, production. If desired will consider term contract with capable management personnel. No brokers but will open discussions with authorized representative of undisclosed principals.

Box G-786

THE OIL AND GAS JOURNAL

Tulsa, Oklahoma

REAL ESTATE

COMPLETELY EQUIPPED fireproof garage, 2000 sq. ft., 2 gas pumps and tanks. Plenty of outside storage with trackage. Ideal for pipe line or supply maintenance. For sale or lease. Okla. City Box 7098. Phone WI 3-4451.

ON NEW BYPASS easily accessible for heavy equipment 3000 sq. ft. air-conditioned office space, 6 private offices. Plenty of warehouse space, open storage and parking. Adjacent to trackage. Ideal for pipe line or supply operation. Box 7098, Okla. City. Phone WI 3-4451.

SPACE IS NEEDED! A Journal display classified advertisement is the quickest way to rent or sell your real estate. In the present period of expansion oil industry firms urgently need the space you have available. If it isn't listed here, you may also find it by stating your needs in these pages. For classified rates see box heading or write The Oil and Gas Journal.

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776 Acres in Rogue River Valley. Free water for over 130 acres. Many open meadows. Balance in good stand fir and pine. Live stream. Secluded yet within easy reach of ready markets. Complete line of modern equipment, 2 sets farm buildings plus ranch headquarters. New massive early American home. Modern feed barn 650 ton capacity. Repair shop and storage for equipment. Fenced and cross-fenced. Ideal purebred operation. For full information write

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Three Sales Promotions Announced by Lubrizol Corp.

Announcement of three promotions in the sales division of The Lubrizol Corp., of Cleveland, was made recently by F. Alex Nason, vice president in charge of marketing.

John H. Baird has been promoted to assistant to the vice presidents in charge of marketing and sales in the Cleveland office. William W. Schafer has been made Lubrizol's Mid-Continent sales representative at Tulsa, and Charles B. Collins has been made sales representative for the East Central areas of the United States and Canada.

Baird graduated from Case Institute of Technology in 1932, with a degree in mechanical engineering, and has been with Lubrizol since 1933. For the past 14 years he has been in charge of sales for the company's Mid-Continent sales division in Tulsa.

Schafer is a graduate of Rollins College, Winter Park, Fla., with a bachelor of science degree. He came to Lubrizol in 1950.

EQUIPMENT MEN
. . . in the News

Oakes Appointed District Manager for Petroleum Tool

BILL OAKES

William V. (Bill) Oakes has joined Smith Bit Distributing Co., Inc., and Petroleum Tool Co., Inc., as district manager for the Hobbs, N. M. area. Oakes is a graduate of Texas Technological College School of Petroleum Engineering. Prior to his new appointment, Oakes served four and one-half years with Technical Oil Tool Co.

Foxboro Establishes New Branch in Amarillo

The opening of a branch office in Amarillo, Tex., has been announced by The Foxboro Co., Foxboro, Mass., manufacturer of industrial instruments for the measurement and control of process variables.

Assigned to the office as industrial engineer is D. T. McElligott, a graduate of Texas Technological College with a degree in electrical engineering. McElligott, formerly with Foxboro office in Dallas, will serve instrument users in parts of Oklahoma and New Mexico, in addition to the Amarillo area.

The new branch is the sixth to be established by Foxboro in Texas. Others are located at Houston, El Paso, Corpus Christi, and Odessa, Tex., with repair and manufacturing facilities in the branch factory at Dallas.

Hudson Named Trustee Of Stevens Institute

Edward J. Hudson, president of the Hudson Engineering Co., Houston, was elected a member of the board of trustees of Stevens Institute of Technology at the annual meeting of the trustees in early November, held at Castle Stevens on the Hoboken, N. J. campus.

Hudson has been engaged in the production, transportation, and processing of both oil and natural gas since his graduation from Stevens in 1926. The honorary degree of Doctor of Engineering was conferred on Hudson by Stevens last June.

Auguste G. Pratt, chairman of the board, The Babcock & Wilcox Co., was renamed chairman of the executive committee of the trustees.

William Georges Broadens Steel Procuring Service

William S. Georges and Associates, organized in 1947 to expedite ordering, manufacturing, and delivery of oil country tubular goods, has recently broadened its scope to include both conversion of steel into casing and tubing, and into coils and sheet steel.

The firm works directly with steel mills and oil companies in procuring ingots to ship to mills with capacity available for making rolls or strips. Rolls or strips are, in turn, shipped to a mill with available tubing capacity. Tubular goods is then shipped from the mill, directly to the oil company.

In addition to expediting manufacturing and shipping, William S. Georges follows through on all metallurgical, quality control, chemical, and engineering phases to assure delivery of tubing that meets API specifications on time. The oil company purchasing the tubing is billed direct by the mill that furnished the ingots, the mill that turns ingots into coils or strips, and the mill that converts strips or coils into finished oil country tubular goods.

G.-E. Supplies Equipment For Point Breeze Plant

An estimated $930,000 worth of electric equipment was furnished by the General Electric Co. for the expansion of the Point Breeze, Philadelphia plant of The Atlantic Refining Co.

Scheduled for completion early next year, Atlantic's $50,000,000 expansion program involves the installation of a 50,000 bbl. per day crude distilling unit, a 12,000 bbl. Atlantic "Catformer," an Orthoflow catalytic cracking unit, a sulfuric acid alkylation unit, and a 100-ton per day ammonia plant utilizing hydrogen, a byproduct of Atlantic's "Catformer."

For the new Orthoflow catalytic cracking unit and the sulfuric acid alkylation unit, G.-E. supplied five large synchronous motors, two rated at 2,250 hp. and one each at 3,000, 4,000, and 5,000 hp. Forty-nine small motors ranging from 2 to 150 hp., starters, controls, and out-door metal-clad switchgear also were furnished for this phase of the expansion.

The anhydrous ammonia plant will use a total of eight General Electric synchronous motors in its operation, in ratings ranging from 400 to 1,750 hp.

Muldrow Aerial Surveys Names Walsh, Karlskind

M. Ellison Muldrow, president of Muldrow Aerial Surveys Corp., Oklahoma City and Midland, Tex., has announced the association of Don K. Walsh and Don B. Karlskind as sales representatives.

D. K. WALSH

D. B. KARLSKIND

Immediately prior to his association with Muldrow Aerial Surveys, Walsh was sales engineer for Vector Manufacturing Co., Houston, directly responsible for sales and service of seismograph cables and accessories to oil companies and seismograph contractors.

Karlskind's experience includes engineering with Western Electric Co., Kearny, N. J., and sales manager for Vector Manufacturing Co., the position he held until his association with Muldrow Aerial Surveys Corp.

Offshore Exploration Firm Organized at Houston

Officers and directors of Offshore Exploration Group, Inc., Houston, have announced its organization to specialize in offshore seismic exploration. Officers of the new firm are: John W. Flude, president; Edgar R. Locke, vice president, and Thomas Garth, secretary-treasurer. Company directors are: A. L. Ladner, Apache Exploration Co.; G. A. Berg, Berg Geophysical Co.; T. I. Harkins, Independent Exploration Co.; C. C. Zimmerman, Keystone Exploration Co.; Robert H. Ray, Robert H. Ray Co.; Sam D. Rogers, Rogers Geophysical Co.; W. H. Taylor, Taylor Exploration Co., and D. F. Broussard.

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General American Enlarges New York General Offices

John P. McFadden, vice president of General American Transportation Corp., recently announced that beginning November 23, the New York offices of General American will occupy the entire 23rd floor of the new 380 Madison Avenue building. Eastern headquarters offices for all of the corporation's division will be located at the new address.

General American's divisions which will be housed in the new offices are: Car Operation Division, Car Building Division, Tank Storage Terminals Division, Plate and Welding Division, Field Erection Division, Process Equipment Division, Plastics Division, Export Division, Kanigen Division, Trans-Flo and Airslide Car Division, and General American-Evans Co. (a wholly owned subsidiary).

Maintenance Adds Vener To Engineering Staff

Maintenance Engineering Corp., Houston, sales representatives for Graver Water Conditioning Co., has added Alvin S. Vener to its staff of engineers.

Vener holds the degree of bachelor of science in chemical engineering from the University of Texas and he has been a process engineer for several Texas concerns.

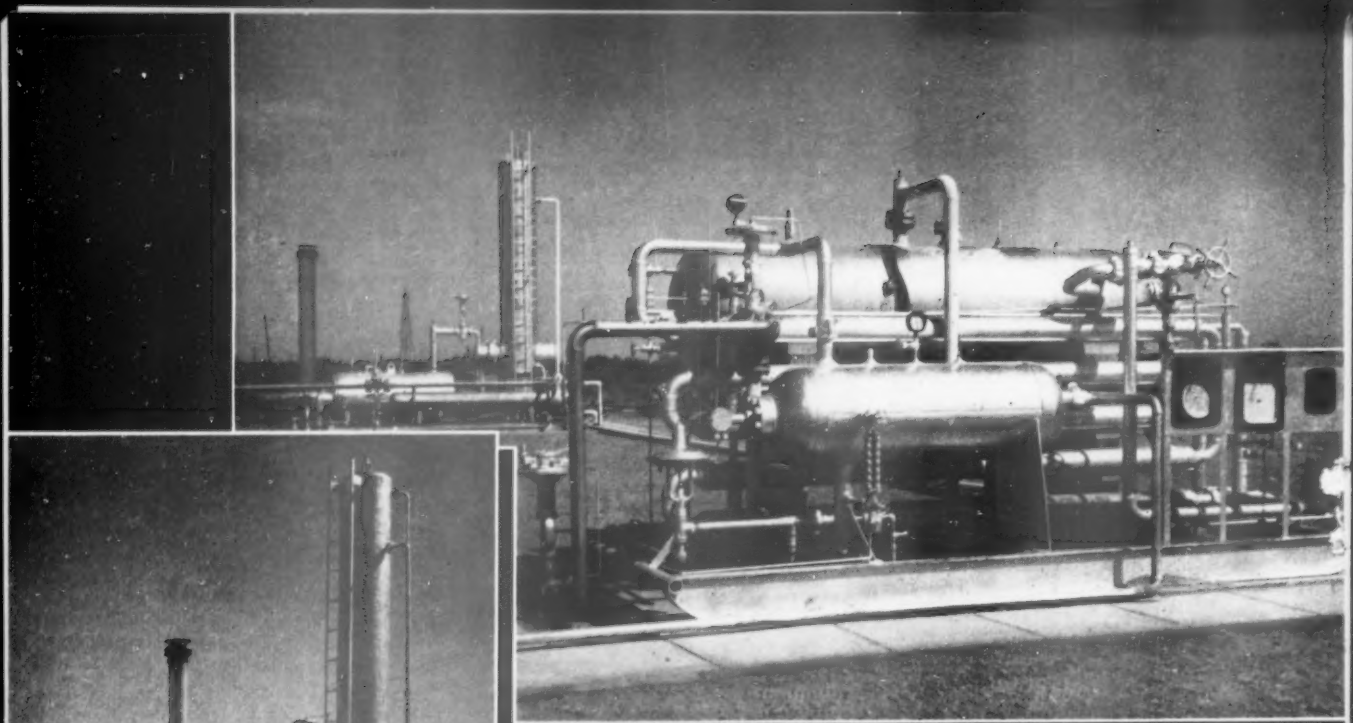
(Report for November 7 was Delayed by Armistice Day Holiday and has been Included in This Week's Statistics Section on Page 169)

A.P.I. REFINERY REPORT, NOVEMBER 14

(Thousands of barrels)

District—	Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.	Stocks† Gaso.‡	Kero	Dist.	Resid.	Bureau of Mines, November 1952 Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.
East Coast	1,044	418.6	39.1	229.1	200.6	33,357	15,369	49,945	12,633	1,076	426.9	37.3	273.6	249.1
Appalachian:														
District 1	112	53.4	6.7	25.9	15.1	4,010	626	1,680	852	107	45.6	7.2	17.9	14.1
District 2	95	48.3	8.3	15.6	11.0	1,806	682	763	106	89	42.6	8.1	13.5	14.9
Ind., Ill., Ky.	1,350	768.7	88.2	241.7	189.7	28,195	9,563	24,270	4,689	1,307	710.0	85.7	233.0	187.0
Okla., Kans., Mo.	593	358.0	21.0	131.9	49.1	14,714	2,104	12,381	1,285	586	335.7	10.0	146.7	62.2
Inland Texas	237	169.3	8.3	43.1	29.3	5,798	634	2,708	1,448	252	177.8	12.0	39.3	36.7
Texas Gulf Coast	1,684	814.4	104.7	408.0	231.6	20,842	4,123	17,303	6,894	1,765	823.9	145.4	437.6	264.0
La. Gulf Coast	510	271.0	56.0	115.9	37.8	7,807	2,383	6,927	1,477	528	261.5	66.1	124.0	54.3
N. La. and Ark.	87	39.1	7.4	15.4	5.9	3,459	613	871	168	75	31.1	7.7	19.5	6.9
Rocky Mountain:														
New Mexico	19	12.6		2.9	3.4	184		72	27	20	12.8	0.8	2.5	4.2
Other Rocky Mtn.	197	105.3	1.7	44.3	36.9	4,597	246	2,678	982	234	118.1	7.3	43.4	47.0
California	1,023	447.0	2.3	161.1	369.3	20,185	436	14,385	21,135	1,010	429.5	5.5	159.3	359.0
Nov. 14, 1953	6,951	3,505.7	337.7	1,434.9	1,179.7	144,954	36,779	133,983	51,696	7,049	3,415.5	393.1	1,510.3	1,299.4
Nov. 7, 1953	6,962	3,364.6	330.6	1,438.7	1,178.9	143,732	37,578	135,873	51,336					
Nov. 15, 1952	7,096	3,424.7	353.1	1,556.9	1,235.9	123,313	32,247	119,148	51,942					

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit, and in pipe lines.



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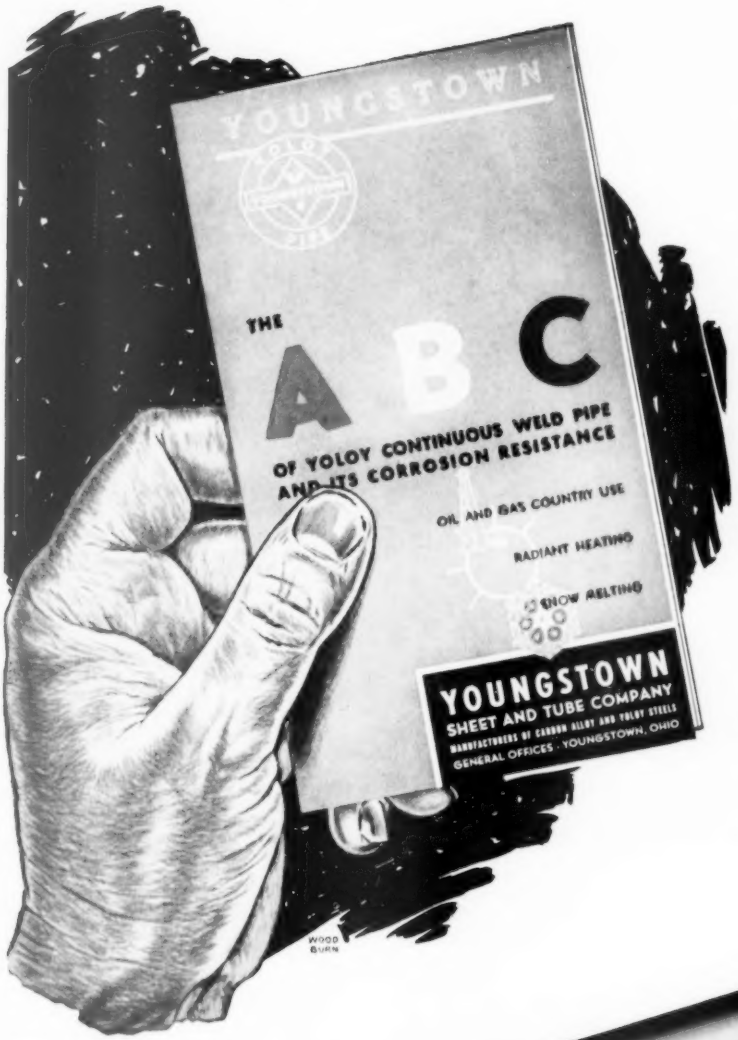

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